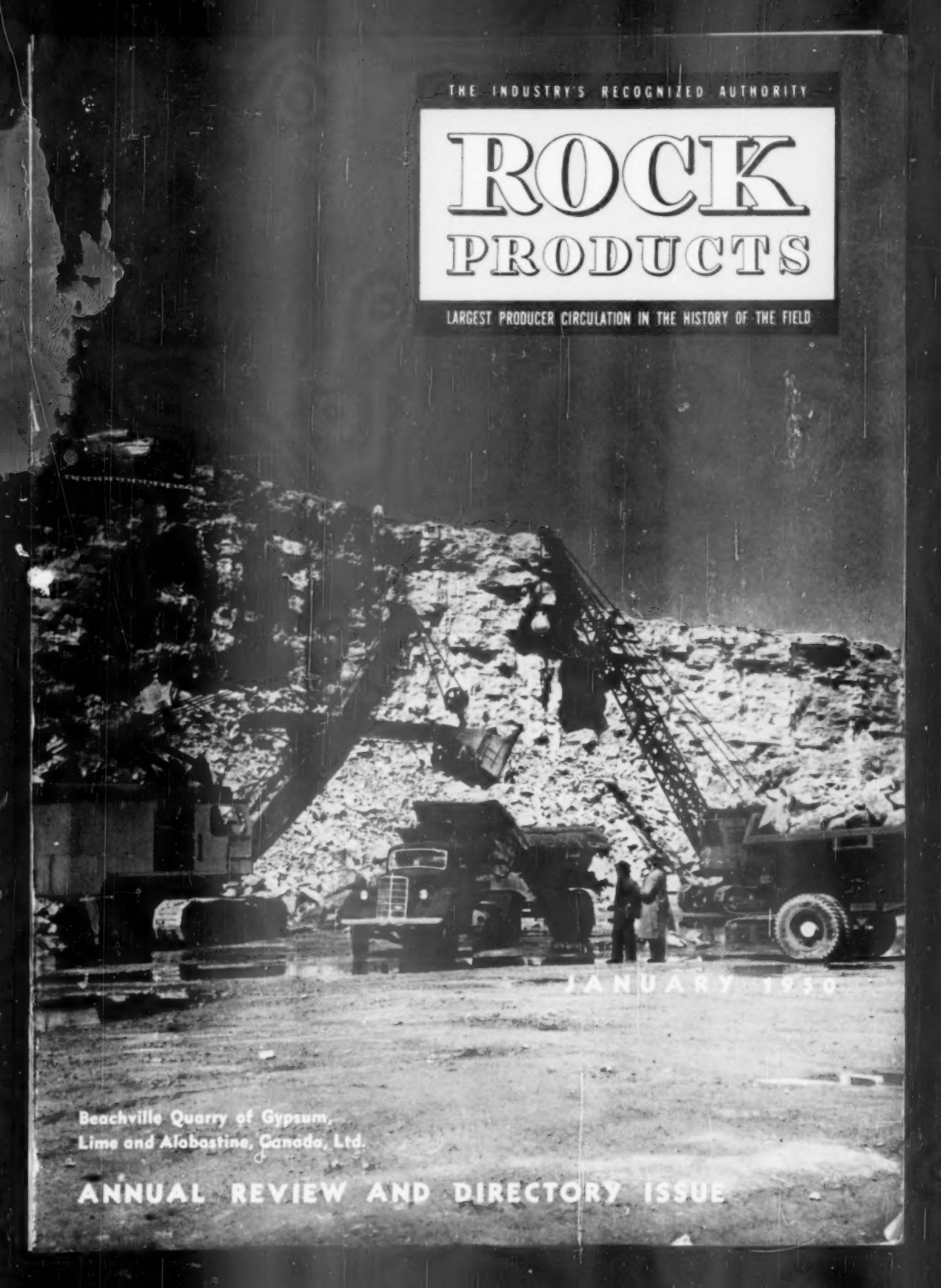
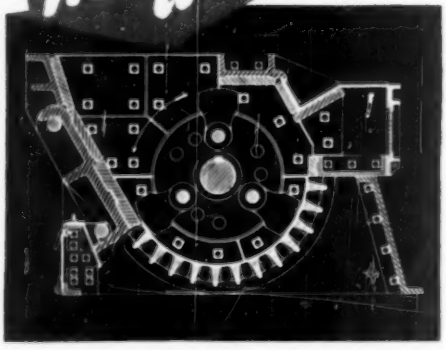

THE INDUSTRY'S RECOGNIZED AUTHORITY
ROCK
PRODUCTS
LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD
JANUARY 1950
Beachville Quarry of Gypsum, Lime and Alabastine, Canada, Ltd.
ANNUAL REVIEW AND DIRECTORY ISSUE

25% to 75% SMALLER INVESTMENT

with a Williams "Super-Slugger" Crusher

Here's why



Feed opening 41"x 30" to 51"x 81". Hammer blows 10,800 blows per minute in the smallest size, each blow 1,285,200 foot pounds to 17,280 blows per minute in the largest size, each blow 2,895,760 foot pounds. Size of product quickly changed by using grates with smaller openings.

because it reduces power shovel loaded rock to 1½ inch or ¾ inch in one operation

In one operation! That means not only a saving in machinery, less depreciation by wear and tear, but the additional savings of foundations, conveyors, drives and buildings. Because the Super-Slugger is a heavy duty hammermill that can crush power shovel loaded rock down to feed size for fine grinding or to commercial crushed stone. Built to do a giant sized job because it's heavily reinforced at all parts subject to shock and wear . . . with extra heavy manganese steel liners. Shafts of unusually large diameter. The Super-Slugger is a real payload and profit builder! For detailed information write for bulletin 634.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 ST. LOUIS AVENUE — ST. LOUIS 6, MISSOURI

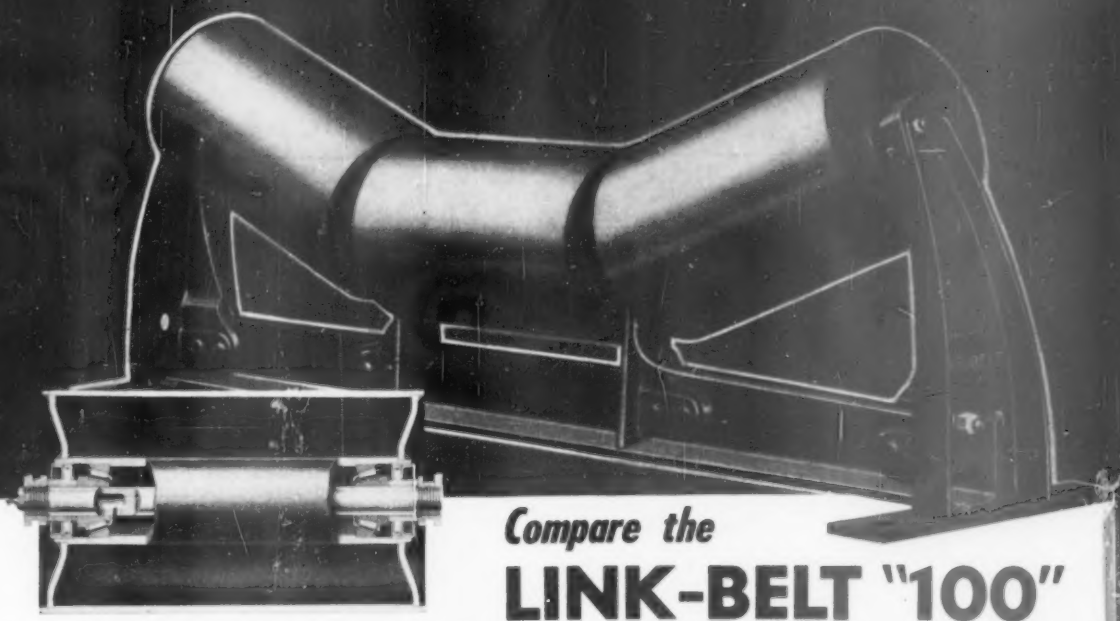
WC-42-4

WILLIAMS ALSO MAKES—

Heavy-duty hammermills in smaller sizes for all quarry operations; impact and roller mills for 200 to 325 mesh grinding; drier mills; air separators; vibrating screens; steel bins; complete "package" crushing and grinding plants.

WILLIAMS

CRUSHERS — GRINDERS — SHREDDERS



Compare the

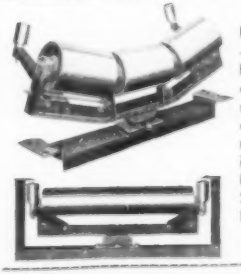
LINK-BELT "100"

Conveyor Idler Construction Features

Complete Line of Idlers

Troughing Idlers — illustrated above

Rubber-Tread Impact Troughing Idlers — recommended for use at loading points of the conveyor, especially when large lumps and heavy or coarse materials are being handled, to provide a cushion to absorb the impact of the material and protect the belt against bruising or tearing.



Positive Action Self-Aligning Idlers — for non-reversible belts. Should be spaced intermittently in both the carrying and return runs to automatically position the belt on the conveyor idler roadbed correcting misalignments due to off center loading, strong side winds, or unequal belt stretch. Counterweighted-Disc Self-Aligning Idlers for reversible belts are also available.

Return Idlers — have same smooth rounded-edge outer shell and interior construction as the troughing rolls, your assurance of an efficient return run with minimum belt wear.

Rubber Tread Return Idlers — for use when handling a wet or sticky material that clings to the belt, as these idlers induce a bending or kneading action to the belt which breaks the material loose. Also ideal for use when handling a material that has a corrosive action on iron or steel.

Link-Belt builds many types and designs of idlers for special services in addition to those illustrated. Refer your belt conveyor idler problem to Link-Belt for sound solutions.

For more than half a century, the name LINK-BELT has stood for pre-eminence in belt conveyor idlers and accessories. The original design has been steadily improved and now the Series "100" Idler offers top quality in this type of equipment. Installations have been made throughout the world and include some of the widest, the longest and the highest belt conveyors.

Link-Belt idlers offer such outstanding features: grease-in-dirt-out seal . . . rolls with smooth rounded-edge outer shell to minimize belt wear . . . high-grade roller bearings . . . interlocking nut and yokes to prevent brackets from spreading under unusual impact . . . end brackets of tough malleable iron are riveted to and extend well beyond the rigid T section cross member to provide stability and transmit load directly to steel bar feet which are welded to each end of the cross member . . . grease fittings for rolls are protected within the deep outer ribs of the end bracket and provide a convenient and safe means for lubrication.

Idlers can now be shipped from stock — full details on Series "100" Idlers are shown in Book No. 1915. It should be on the desk of every engineer using belt conveyors. Address the nearest office.

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

11,648

LINK-BELT

CONVEYING MACHINERY

"THE COMPLETE LINE"

SEE OUR EXHIBIT, SAND & GRAVEL, CRUSHED STONE AND READY MIXED CONCRETE SHOWS, JAN. 23 THRU FEB. 1, STEVENS HOTEL, CHICAGO

JANUARY, 1950

ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY

VOL. 53, No. 1

Bror Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

This Month

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To Subscribers—Date on wrapper indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

Photo Courtesy E. L. Bruce Company

They wanted a rubber band that would not stretch

A typical example of B.F.Goodrich product improvement

IF YOU think all rubber is alike, take a look at that 80-foot-long rubber band "worth its weight in gold" because it *will not* stretch.

That belt drives all the machinery in the world's largest wood flooring mill. It used to be a leather belt but that stretched so badly it had to be re-glued every 30 days. Too expensive; too much trouble.

Someone suggested a rubber belt—but wouldn't a rubber belt stretch even more? Not the way B.F.Goodrich makes it. Our engineers had developed a belt so strong it rarely stretches and then invented a way to lock belt ends together (Make a belt endless, it's called) with a splice which never tears loose. Belt users say it ends 90% of all belting troubles and failures, makes belts last many times as long on many drives.

In the flooring mill, the belt in the picture has been in use 5 years.

Not once has it needed any attention nor repair; it has not stretched at all.

For long uninterrupted belt life, for constant machine operation with no delays for belting failures, the B.F. Goodrich Plylock Splice, as it is well named, has no equal. Your B.F.Goodrich distributor can make belts endless in your plant on the drive, or he can show your own employees how to do it. Call him. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

TIMKEN® revolutionizes the one-use rock bit!

NEW "SPIRALOCK" BIT GIVES YOU ALL THESE ADVANTAGES:

NON-RIFLING!

FAST CUTTING!

EASIER TO GET ON AND OFF!

NON-CHOKING BACK FACE!

STAYS ON DEPENDABLY!

CROWNED-CHISEL PILOT!

ANY DRILL STEELS CAN BE USED!

SIMPLIFIES PREPARATION OF DRILL STEELS!

MADE OF LONG-LASTING TIMKEN STEEL!

A NEW one-use rock bit developed by The Timken Roller Bearing Company offers you special advantages that can't be equalled by any other one-use bit. It's the revolutionary Timken® one-use "Spiralock" bit!

The new bit has a unique "Spiralock" union—a square socket that spirals slightly as it recedes. The superiority of this union has been proved under actual on-the-job conditions.

The bit stays on dependably in the hole. Yet it's easier to get on and off. Just a few blows of the drill and it's on; just a few blows of a hammer and it's off. Steels last much longer, are easier to prepare and recondition. Existing drill steels of any size and section can be adapted easily and quickly.

Other great advantages of the new bit are: Fast-cutting design. Crowned chisel pilot for easier starting and "collaring." "X" cutting edge that prevents rifling in any ground. Non-choking back face, scalloped and rounded off to prevent chips packing behind the bit. And because it's made of Timken electric furnace steel, the "Spiralock" bit has a long life.

The new one-use "Spiralock" bit—designed for drilling jobs where bit reconditioning is impractical or undesirable—is the latest addition to the Timken rock bit line, which includes the famous threaded multi-use bit and threaded carbide insert bit. And Timken is the only company that offers you *all three* types.

For help in selecting the right bit for your job, call on our rock bit engineering service. Write to The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

ROCK BITS

Your best bet for the best bit for every job

1 Timken threaded multi-use rock bit.

2 Timken threaded carbide insert rock bit.

3 Timken one-use "Spiralock" rock bit.

THIS *Simplicity of Design...* means lower cost in the Pit!

Look at that deck! Only two main shafts! Few gears! A direct line of power and all operating mechanism back of the center pin.

Cast Steel Machinery Side Frames maintain rigidity and shaft alignment, reducing wear that would result from weaving.

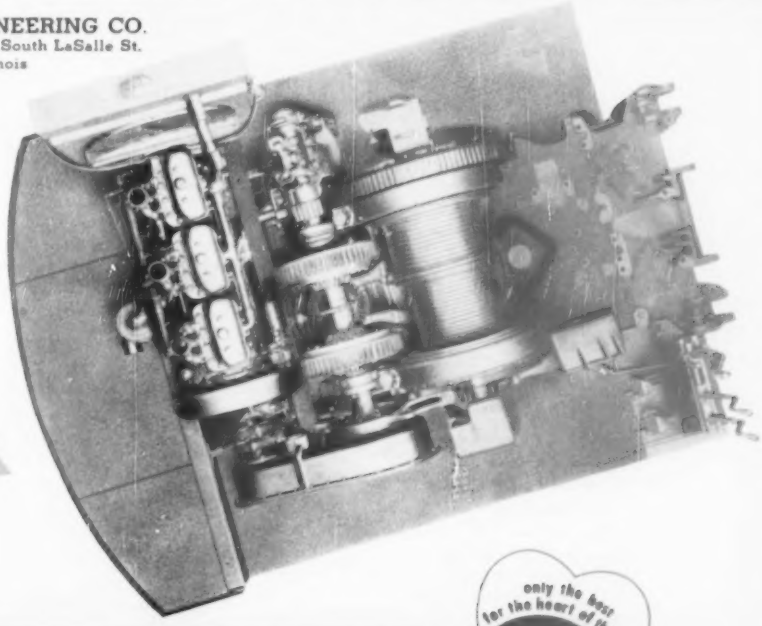
Ball and Roller Bearings on all high-speed shafts reduce friction to a minimum. Clutches are large and cool running. Lubrication and upkeep is easy.

Simplicity of Design means money. It encourages upkeep and reduces "down time." This is just another of the many Northwest advantages that makes it a better Rock Shovel.

Ask Northwest Owners. There is a good reason why one out of every three Northwests sold is a repeat order in the heart of the job. You can't afford anything but the best for the *Key Spots*.

You can plan ahead to have a Northwest. Let us tell you how.

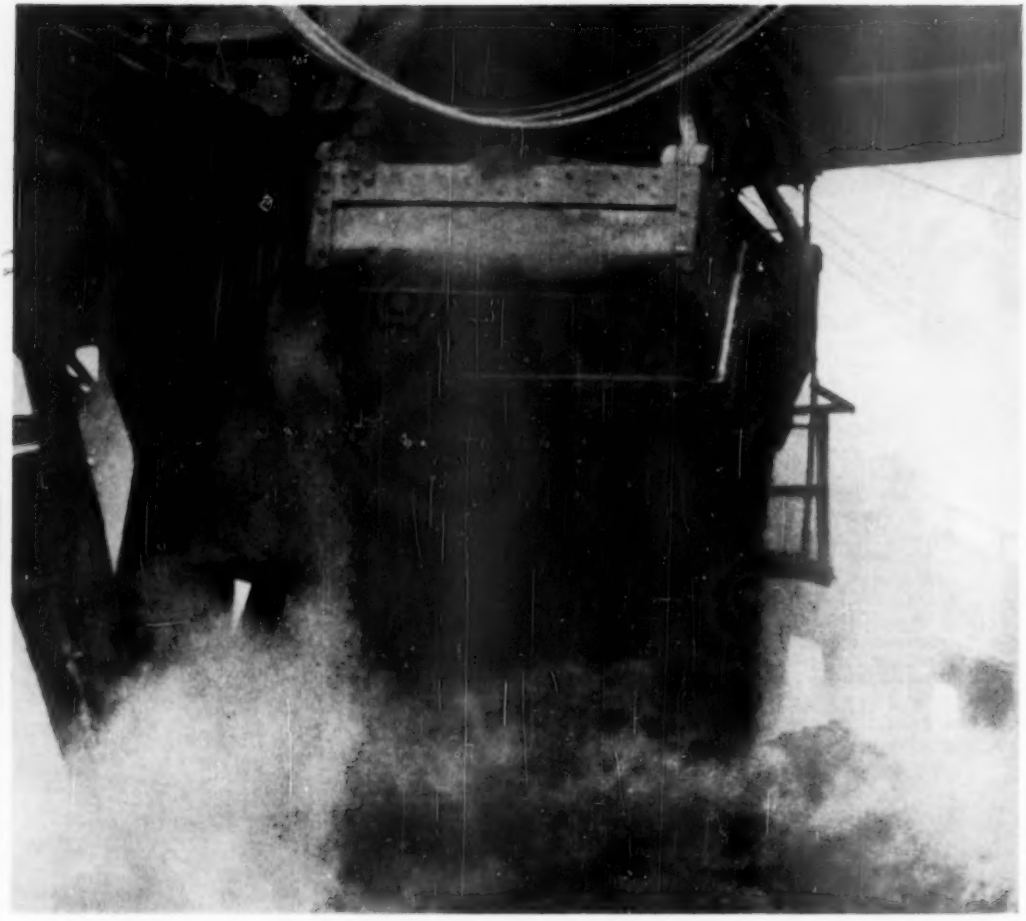
NORTHWEST ENGINEERING CO.
1514, Field Building, 135 South LaSalle St.
Chicago 3, Illinois



only the best for the heart of the job
MEET YOUR KEY MACHINE
A REAL ROCK SHOVEL
PROFIT

NORTHWEST

Convertible for any Mining, Material Handling or Excavation Problem



Who said "WORN OUT"?

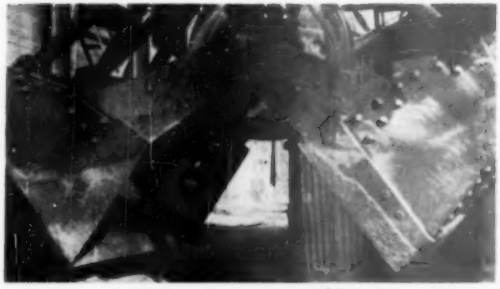
Life begins with Stoody Self-Hardening 21

The low-cost alloy for all-around bucket protection

Exceptional Abrasion Resistance
Good Impact Qualities
Unmatched Burn-Off Speed
AC-DC Application*
No Slag Interference
Wide Amperage Latitude
Bonds Readily to Manganese Steels, Cast Iron and Common Steels

*Bare Stoody Self Hardening **21** goes down faster and handles as easily as coated rods with DC equipment – in fact many welders prefer it!

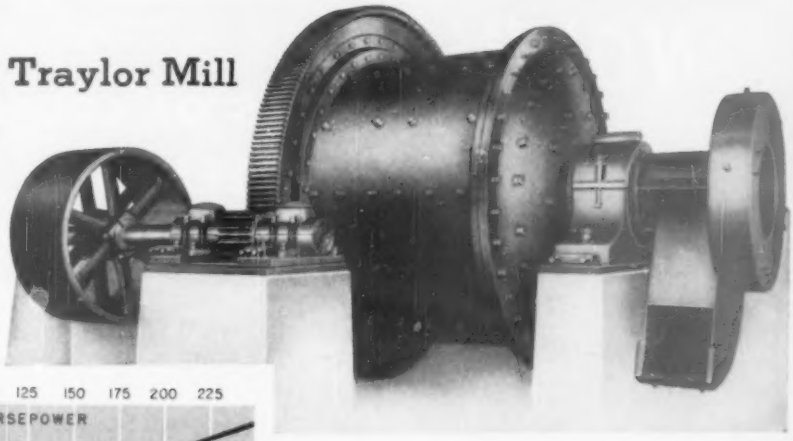
For overall bucket protection, on lips, teeth, runners, bucket sides and bottoms, use Stoody Self-Hardening **21.** Try 50 lbs. on your next order. Available from any Stoody Dealer. *Write for literature and copy of Stoody Hard-Facing Guidebook.*

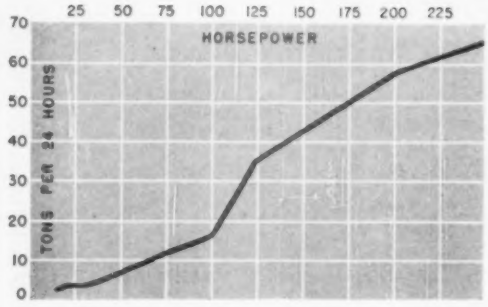


STOODY *Alloys*

STOODY COMPANY
11929 East Slauson Avenue, Whittier, California

There's a Traylor Mill for every grinding job . . .



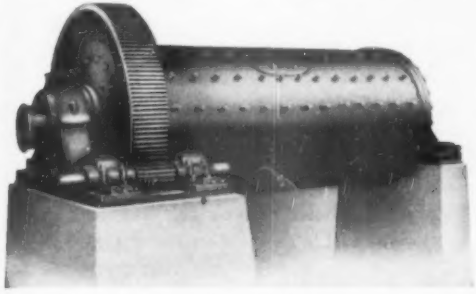


This Chart illustrates the efficiency of Traylor Ball Mills by comparing their high production rate with low power requirements. These figures are based on a typical wet grind in closed circuit of minus 2" Inspiration ore to minus 200 mesh.

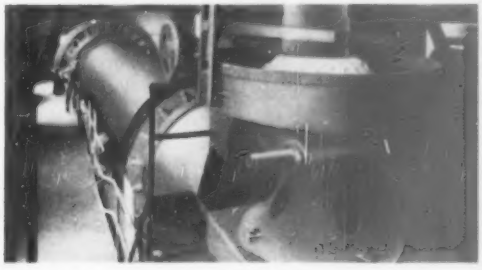
Where greatest efficiency demands "tailor-made" grinding . . . Traylor Mills are at work

Increasing costs of many phases of production make it imperative for operators to consider the mechanical efficiency of their plant as a major factor in economical production.

Traylor Ball Mills . . . "tailor-made" for their job . . . are the result of Traylor's 40 years experience in designing and building mills for specific grinding jobs . . . mills that have built their reputation for efficiency on the job.



Traylor Compartment Mills, Rod Mills and Pebble Mills all demonstrate similar high efficiency in their own ranges. Traylor engineers will be glad to recommend the most efficient type and size for your needs.



Traylor Engineers have had broad experience in designing Mills for all types of grinding operations. Write for their helpful advice today.

TRAYLOR ENGINEERING & MANUFACTURING CO.
106 Mill St., Allentown, Pa.

Sales Offices: New York, N. Y., Chicago, Ill., Los Angeles, Calif.
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P. Q.

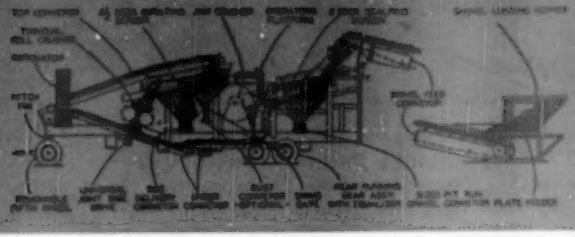
Traylor

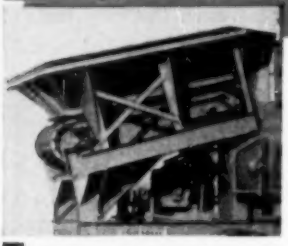
Rotary Kilns, Coolers and Dryers
Grinding Mills . Crushing Rolls
Jaw, Reduction and Gyratory Crushers

A "TRAYLOR" LEADS TO GREATER PROFITS

NOW! 3 STAGES OF CRUSHING 2 SCREENS IN 1 GRAVEL PLANT

UNIVERSAL 293-QS
Greater Capacity with Real Flexibility





This apron feeder replaces scalping screen for quarry rock.

Gravel pits containing large rock are no longer a problem. Because the jaw crusher is much larger, the 293-QS takes oversize rock ordinarily rejected. Universal Engineers took the famous Universal 293-Q TwinDual Pacemaker quarry plant, removed the apron feeder, and installed a scalping screen. This screen scalps pit oversize to the primary jaw crusher and screens out sand and gravel not requiring crushing. Material requiring secondary crushing is by-passed to TwinDual Rolls.

100% chips can be produced, or finished material from the scalping screen blended with crushed material from the plant. This flexible high production gravel plant can be converted in the field to quarry operation when the situation demands. One investment provides a plant that really meets today's demands and tomorrow's changing needs. It has many other features you should know. Write for complete details.

Jaw and roll crushers, hammermills, screens, conveyors and bins in any combination—stationary or portable.

UNIVERSAL ENGINEERING CORP., division of PETTIBONE MULLIKEN CORP.

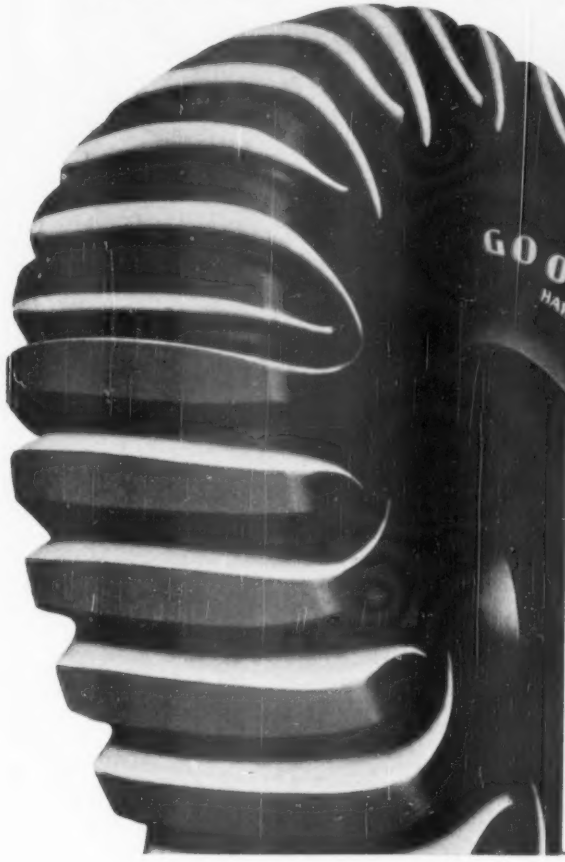
617 C Avenue N. W., CEDAR RAPIDS, IOWA
Phone 7105

4700 W. Division St., CHICAGO 51, ILLINOIS
Phone SPaulding 2-9300

Number 1 tire

for rock work

No tire outperforms Goodyear's famous Hard Rock Lug in tread-tearing back-breaking rock work. Feature for feature, it's your best buy: an extra-tough carcass—extra thick undertread protecting the carcass against bruising—big husky lug bars armoring tread and sidewalls against cuts and rips. And these lugs are designed to form a self-cleaning tread that's tops for traction either forward or reverse. Get the work tire that's head and shoulders above the rest for tire-killing operations. Always BUY and SPECIFY Goodyear—it pays!



THE HARD ROCK RIB

Companion tire for front wheels in rock work – easier steering, smooth rolling, same cord body, same shoulder and sidewall protection as the Hard Rock Lug.

THE ROAD LUG

Specially designed for trucks that operate both OFF- and ON-the-road. This remarkable dual-purpose tire combines off-the-road toughness and traction with on-the-road mileage and economy.

Road Lug—T. M. The Goodyear Tire & Rubber Company

We think you'll like "THE GREATEST STORY EVER TOLD" — Every Sunday — ABC Network

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

More hauls . . . fewer overhauls

The less often your engines need to be overhauled, the better you like it—*naturally!*

For fewer overhauls mean greater availability—more hauls and lower maintenance costs.

We suggest, therefore, that you most seriously consider using Gulflube Motor Oil H.D. in your engines.

This outstanding heavy-duty motor oil will help keep your engines at top performance, and for mighty good reasons:

Gulflube Motor Oil H.D. provides a particularly strong oil film and superior lubrication under the toughest operating conditions. For it has a rich, full paraffin base.

Gulflube Motor Oil H.D. is, also, a *fully detergent* oil. Rings stay clean and free, insuring better compression and proper oil control.

Furthermore, crankcase foam is prevented under all conditions of speed and temperature because Gulflube Motor Oil H.D. contains a patented anti-foam agent.

You owe it to yourself to find out how this quality oil will help you get cleaner engines and lower maintenance costs. Why not call the Gulf Automotive Service Engineer *now*, and discuss your lubrication and maintenance problems with him?

GULF

GULF OIL CORPORATION · GULF REFINING COMPANY

Offices in principal cities in 30 states

★★★★★★ # SIX NEW STAR

NEVER HAVE SO MANY NEW UNITS OF ROAD MACHINERY MANUFACTURER

Four New Motor Graders

Now a Size to Fit Every Job and Budget!

★ **AD-4** 22,140 lbs. . . . 104 brake hp. . . . GM 2-cycle diesel engine.

★ **BD-3** 19,042 lbs. . . . 78 brake hp. . . . GM 2-cycle diesel engine.

★ **BD-2** 17,772 lbs. . . . 50.5 brake hp. . . . GM 2-cycle diesel engine.

★ **Model D** 8,500 lbs. . . . 34.7 brake hp. . . . Allis-Chalmers gasoline engine. A completely new low-cost motor grader with *exclusive* tandem drive. Engineered new from the ground up to bring you BIG grader design and performance advantages.

Note -- The popular Model AD-3, introduced just prior to the war, set the pattern for all these models. Provides 78 brake hp. . . . weighs 21,835 lbs. . . . has GM 2-cycle diesel engine.

Two New Diesel-Powered Tractors

★ **HD-19** With *exclusive* torque converter drive! Load and speed automatically balanced—up to 25% more work on many applications. Weighs 40,000 lbs. 163 hp.—GM 2-cycle diesel engine.

★ **HD-5** Weighs 11,250 lbs. 40.26 drawbar hp. — GM 2-cycle diesel engine. Simple to service, easy to operate . . . more work capacity. A great tractor with a fully matched Allied line.

These two new units, along with the widely used HD-7 and HD-10 tractors, complete the Allis-Chalmers crawler line.

PERFORMERS

Brought to You By Allis-Chalmers Since the War

THIS TYPE BEEN INTRODUCED BY ONE IN SO SHORT A TIME - - - - - - -

Here's proof that Allis-Chalmers plans far ahead to keep you ahead on your work! For it takes years of planning...building and rebuilding . . . testing and retesting . . . on each completely new tractor or motor grader.

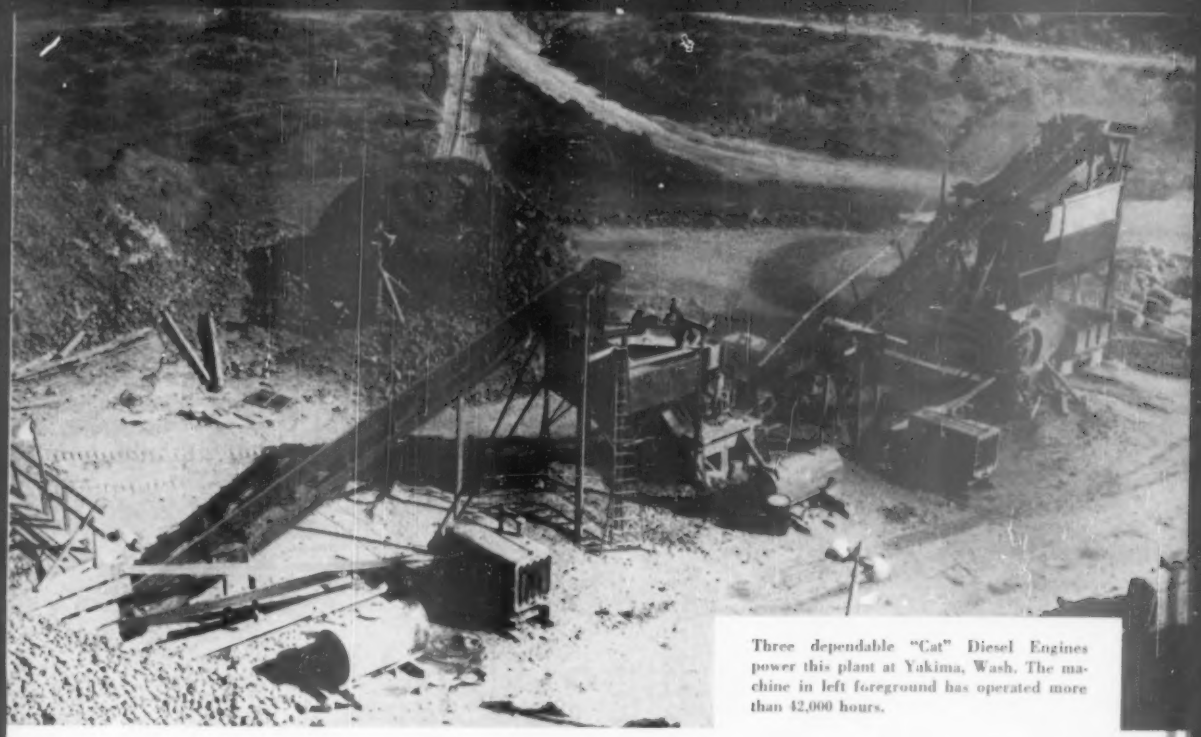
What's more . . . A-C listens to you . . . incorporates *your demands*, as well as the forward thinking and design ideas of its own organization and Allied equipment manufacturers. This complete cooperation is behind every new Allis-Chalmers tractor or motor grader.

Compare the six new machines — feature by feature with any others — and you'll see why they are truly Star Performers. ASK YOUR ALLIS-CHALMERS DEALER FOR A DEMONSTRATION . . . NOW.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Originator of the Torque Converter Tractor



Three dependable "Cat" Diesel Engines power this plant at Yakima, Wash. The machine in left foreground has operated more than 42,000 hours.

HERE'S CRUSHER POWER THAT WON'T BE LICKED!

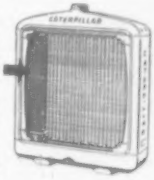
IT TAKES real engine "guts" to stand up to the load and the dust of a crusher plant year after year. The three "Cat" Diesels that power the crushers for C & E Construction Company, Yakima, Wash., deliver a total of 290 yards of rock an hour, and don't know the word "quit."

The oldest engine in the team is a veteran of over 42,000 work hours and is still going strong. Says the owner: "These engines, like all 'Caterpillar' products, are proved equipment. They're well sealed against dust, and that's important to us."

Your "Caterpillar" dealer has the right engine for *your* job —and the parts and service facilities to keep it working profitably long after it's paid for itself. See him today, or mail the coupon.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

LOOK UNDER THE HIDE



Lubricating oils break down at high operating temperatures, forming carbons and gums—enemies of long engine life. To prevent lube oil breakdown, "Caterpillar" Engines are equipped with oil coolers. Pistons are oil sprayed to remove heat. Controlled oil temperature reduces maintenance costs —adds to owner profits. *Look under the hide for quality.*

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL

ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO.
Box RP-1, Peoria, Illinois

Please send me your free informative booklet, "The Right Combination for Crushing."

NAME _____

ADDRESS _____

CITY _____ STATE _____

The ROCKMASTER "16" Blasting System Cuts The Cost Of Handling Rock!

The story could be summed up in two words: *improved fragmentation*. Or you might prefer *better breakage*. However, the details of the ROCKMASTER "16" story make interesting reading for blasters.

This better breakage has increased loading machine and shovel production as much as 40% in mines, pits, quarries, and construction jobs. Many operators have cut secondary shooting in half . . . others have eliminated it. Time once wasted in uncovering and setting aside big rocks now goes into productive work. There's a sequel to this story! Better breakage means lower costs in milling—less work for the crusher and less wear and tear on equipment.

Better breakage is just one of the many advantages of the new ROCKMASTER "16" Blasting System. It helps you produce more material per pound of explosive . . . gives you more footage per round. Sixteen periods—a wide choice of short or long milli-second delays—add up to better control over throw, backbreak, and material size . . . better control over noise and vibration. Sixteen delay periods fire in 550 milli-seconds! There is less strain on timbers and roof . . . less dust and a quicker return to the face.

From the face and the front office you hear: "ROCKMASTER "16" *is the greatest improvement in blasting methods since Atlas introduced milli-second blasting.*" Write for new booklet showing you how ROCKMASTER "16" fits into your operation.

ROCKMASTER "16" TIMINGS

Rockmaster No.	Avg. Time of Each Delay from Zero (milli-seconds)
0 (zero)	0 (inst.)
1	8
2	25
3	50
4	75
5	100
6	125
7	150
8	175
9	200
10	250
11	300
12	350
13	400
14	450
15	500
16	550

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

WICKWIRE ROPE

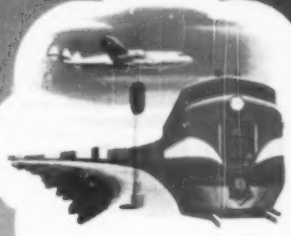
A PRODUCT OF CF&I

Ask any user . . . you'll find them everywhere

In scores of industries, users of Wickwire Rope have developed an affectionate respect for its performance, safety and long life. And, for true economy, they use Wickwire's WISSCOLAY® Preformed. It lasts longer — is easier to cut, splice and install. It's kink-resistant and safer to handle. Wickwire Distributors and Rope Engineers, in key cities everywhere, are prepared to render prompt service in meeting your wire rope needs. Wickwire Rope Sales Office and Plant — Palmer, Mass.

IN THE EAST—Wickwire Spencer Steel Div. of C. F. & I.
500 Fifth Ave., New York 18, N. Y.
IN THE ROCKIES—The Colorado Fuel and Iron Corp.
Continental Oil Bldg., Denver, Colo.
ON THE WEST COAST—The California Wire Cloth Corp.
1060—59th Ave., Oakland 6, Cal.

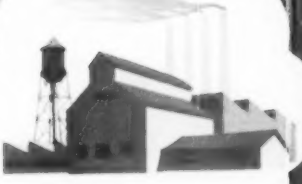
LOGGING



TRANSPORTATION

MINING

PETROLEUM



MANUFACTURING

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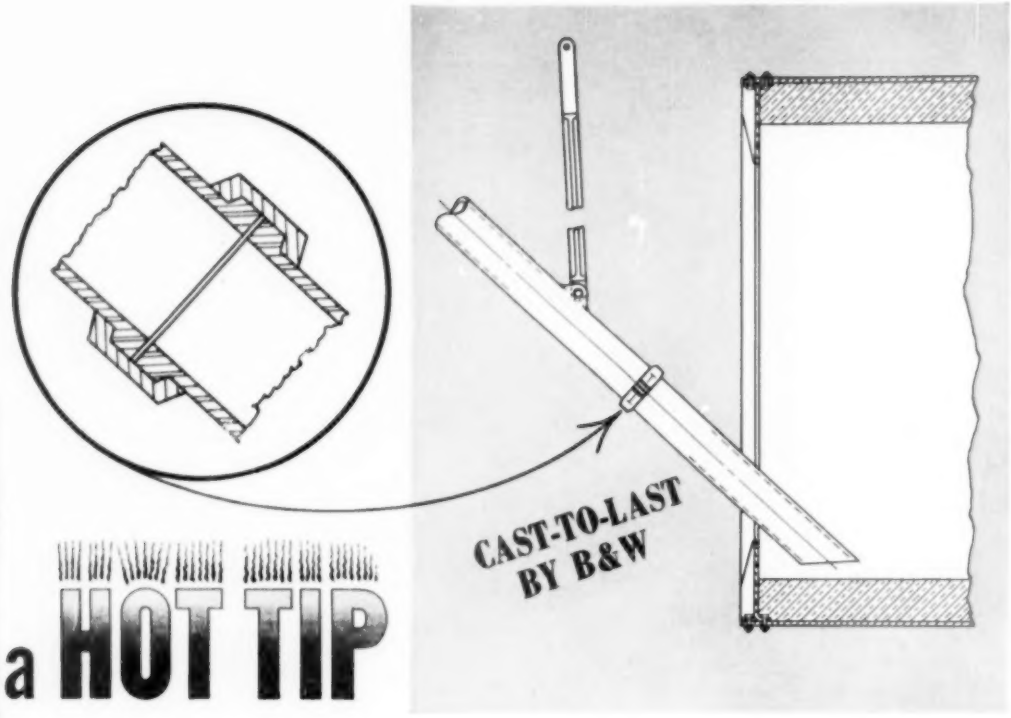


a HOT TIP on feed-pipe economy

Feed-end temperatures of many rotary kilns are too hot for ordinary metals. Oxidation and cracking of feed-pipes are added to the ever-present problem of destructive abrasion . . . *unless* you use pipes that combine heat-resistance *and* wear-resistance in optimum proportions.

B&W cast alloy feed-pipes consistently outlast conventional types by substantial, money-saving margins. Even when they do succumb after years of continuous service, only the exit ends of the pipes need be renewed. A special cost-saving clamp, located to suit service conditions, makes it convenient to replace only the lower part of an assembly.

These long-lasting feed-pipes, together with B&W Tail-Ring Castings, are providing efficient, low-cost operation on many kilns. It will pay you, as it has many others, to investigate their initial and operating economies. The Babcock & Wilcox Co., 85 Liberty Street, New York 6, N. Y.

BABCOCK & WILCOX

S-94

YOUR EQUIPMENT MUST EARN DIVIDENDS

Fuller equipment has always been designed and built with one idea in mind . . . to produce efficiently, and at the lowest operating cost. We feel that this has been proved, through the years, by the general overall acceptance of this company's products in the cement manufacturing industry.

On these pages we have illustrated, and briefly described, some of the major equipment manufactured by us; some old, some new, which the operating man in the industry employs for efficient, cost-reducing production.

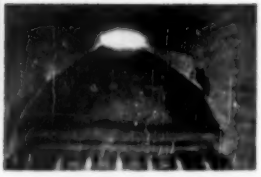
OUTSTANDING CONTRIBUTIONS TO THE CEMENT INDUSTRY

Fuller-Kinyon Conveying Systems

This system was accepted by the cement industry many years ago as the clean, safe, and efficient method for conveying pulverized coal, cement raw materials, and finished Portland cement. Today it is considered standard conveying practice in the industry, over 96 percent of the cement plants in the United States use this system, as well as many plants throughout the world.

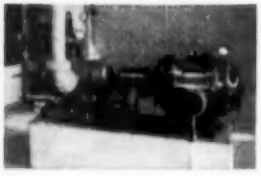
F-H Airslide Conveyor

The latest, and, we feel, one of the outstanding contributions to efficiency and cost reduction, ever to be offered the cement industry. A revolutionary type of conveyor for transporting fine, dry materials, without the use of moving parts. By contrast with mechanical conveyors, it offers reduction in power to a fraction of previous costs; eliminates hazards to workmen; no lubrication; permits flexibility of plant design not available with straight-line conveyors; low maintenance cost.



Fuller Inclined-Grate Cooler

A three-purpose cooler—abrupt air quenching, heat recuperation, and final cooling. Ever since the first commercial installation was made, for cooling clinker, about 10 years ago, it has met with unusual success. It has been declared as one of the outstanding developments in the industry in recent years.

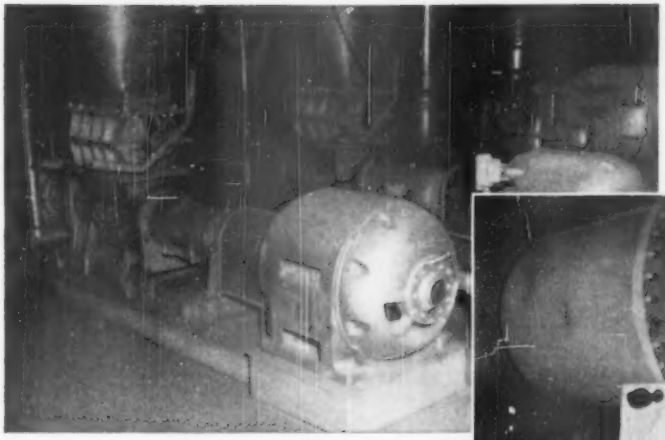


Fuller Rotary Compressor

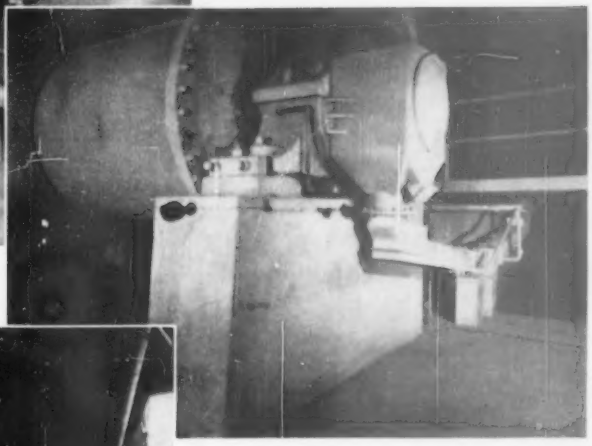
Many cement plants have practically standardized on Fuller Rotaries, taking advantage of "spotting" compressors at the point of use . . . air, where needed, at the proper pressures to do the work required most economically and efficiently. This is especially advantageous with Fuller-Kinyon Systems, where air demands range from 15 to 45 pounds. Compressors used in this manner, can be shut down when the various departments have completed their daily cycle of operation. This means maximum overall savings in power and maintenance.

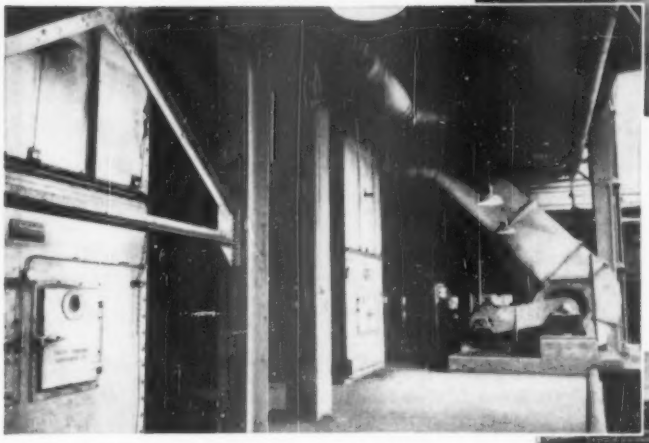
Fuller **EQUIPMENT FOR BETTER OPERATION**

Fuller-Kinyon, Fuller-Fluxo, Airveyor, F-H Airslide Conveying Systems . . . Rotary Feeders and Valves . . . Rotary Compressors and Vacuum Pumps . . . Inclined-Grate Cooler . . . Pulverized Material Cooler . . . Material-Level Indicator . . . Aeration Units . . . Airlift . . . Constant-Head Feeder . . . Slurry Valves . . . Motion Safety Switch . . . Samplers



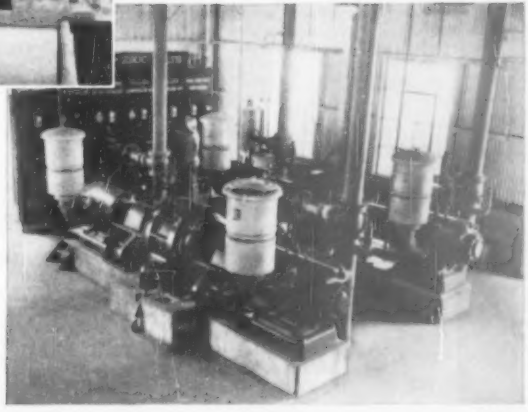
Left: Two Fuller-Kinyon Pumps for transporting finished Portland cement, a distance of 1100 feet, to storage silos. A Fuller Rotary Duplex Compressor, direct connected to the pumps, furnishes air for conveying, capacity 2100 c.f.m., 35 lb. pressure. One of the pumps serves as a standby.





Above: F-H Airslides collecting cement raw material from two tube mills; power requirements, approximately 1/8th horsepower. These Airslides replaced a screw conveyor, driven by a 5-hp. motor.

Above: Two Fuller Inclined-Grate Coolers installed for cooling cement clinker. Each cooler has a rated capacity of 5000 barrels of clinker every 24 hours. Clinker temperatures are reduced from approximately 2500-deg. fahr. to 150-degrees.



Right: Two Fuller Rotary Duplex Single-stage Compressors. Each has a capacity of 2040 c.f.m., at 40 lb. pressure. These compressors furnish air for a Fuller-Kinyon Conveying System for transporting cement from storage silos to an ocean going cement-carrying vessel.

G-61T

FULLER COMPANY

CATASAUQUA — PENNSYLVANIA

CHICAGO 3
120 So. LaSalle St.

SAN FRANCISCO 4
420 Chancery Bldg.

Tuffy

TRADE MARK ®

SLINGS

Entirely Unlike Any Other

Scores of wires, stranded into 9 parts, then machine woven into an interlaced wire fabric—that is the unique patented construction which gives Tuffy extraordinary flexibility and stamina.

Super TOUGH—On every kind of load, under all kinds of pulls and with every type of hitch, Tuffy Slings have proved their superiority and universal adaptability.

Super-FLEXIBLE—Tie Tuffy Slings into knots, kink them, flatten the eyes. Observe how many more times you can straighten Tuffy Slings out without material damage. Note too, that cutting any one of the 9 parts will not result in stranding the sling.

Tested Strength Twice Safe Working Load Limit

Each Tuffy sling is proof-tested to twice the safe working load indicated on its metal tag. Tuffy's interlaced construction makes possible eye splices averaging 95% of fabric strength.

9 Types—Factory Fitted Or Unspliced on The Reel

Try any one of the 9 factory packaged types — for choker, basket or bridle hitches. Prove to your own satisfaction their money saving worth to you. Or, if you're rigged for splicing—Tuffy interlaced wire sling fabric is available on the reel.

union *Wire Rope* **CORPORATION**

2156 Manchester Ave., Kansas City, Mo. Send Tuffy Sling details.

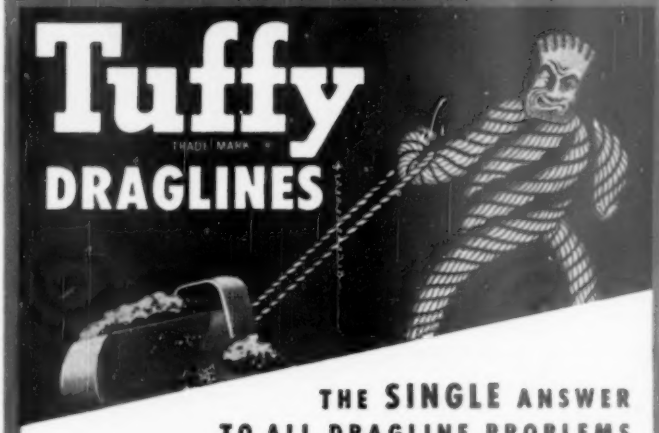
FIRM NAME_____

ADDRESS_____

CITY_____ STATE_____

Now.... Tuffy

TRADE MARK ®



Tuffy

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DRAGLINES

THE SINGLE ANSWER TO ALL DRAGLINE PROBLEMS

Just the Size, Length and Name . . . TUFFY . . . No More Confusing Specifications

Try this simple way of buying draglines. Put Tuffy draglines to any test. Watch them come out on top with unequaled, money saving service records.

Extra Flexibility. Wires of the finest steel in a construction designed for universal dragline service, gives Tuffy draglines the extra flexibility needed without sacrificing other qualities.

Maximum Abrasive Resistance is obtained by finer technic in construction with materials toughened to withstand more abrasive wear.

Easy To Handle because it is pliable. Tuffy Draglines spool better and ride better on grooves.

Hugs Drum When Casting because jerking, pulling and bending stresses do not distort its pliable construction.

Stamina Proved In All Operations. Operating in dry dirt, wet dirt, sand, gravel, rock and minerals and on all types of equipment, Tuffy Draglines stand up under more days of service and move far more yardage than the best previous average obtained by many operators.

Remember, Tuffy is the name to remember.

union *Wire Rope* **corporation**

2156 Manchester Ave., K. C., Mo. Send Complete details on Tuffy Draglines.

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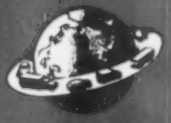
union *Wire Rope*

The Ultimate Low Cost Wire Rope

Simplifies Wire Rope Buying!

Remember the name Tuffy and you can forget complicated wire rope specifications. Union Wire Rope Engineers have developed wire rope constructions and braided wire fabric constructions to serve universally in specific fields of operation. Now all you need to do is specify the diameter and the length and the name Tuffy Scraper, Tuffy Dragline or Tuffy Sling. It is just that simple to buy the ultimate low cost wire rope or sling.



BETTER LIVING through BETTER ROADS
LET'S FACE THE FACTS GOOD AND BAD

Citizens of the U.S.A. have paid road builders $35 Billion for highways. Almost every citizen will agree it is about the best investment the U.S.A. ever made, i.e., they will when informed that it generates an annual income of more than $30 Billion in oil, rubber, motor cars, trucks, roadside services, etc.
In 1949 the U.S.A. bought $1.7 Billion worth of highways. That marked the highest rate of investment in the history of road building.
This brings the highway system up to a point adequate for handling the traffic of 1925 or 1935. Since 1935, the number of vehicles on the road has increased from 26½ million to nearly 44 million.

Road Builders Face a Selling Job

The deficiency in highways is enormous. Estimates of this deficit range as follows: $11 Billion by U.S. Bureau of Public Roads; $20 Billion by Joint Economic Committee of Congress; $30 Billion by American Association of State Highway Officials and $50 Billion by the American Road Builders' Association. These estimates cover the building and rebuilding of mileages ranging from 38,000 to the whole system consisting of 3,363,000 miles.
This confronts Road Builders with a challenge to become Better Road Salesmen constituting on the job of selling all legislative bodies that the road deficit can be wiped out relatively cheap considering what is at stake—providing they are built by contract—the American way of giving the highway dollar the highest possible purchasing power.

Tuffy Scraper Rope

TRADE MARK ©

Picks Up and Lays Down More Pay Dirt on All Types of Wheel Scrapers

"Two thirds fewer cuts due to drum crushing." "Wears out instead of breaking." "Gave 33-1/3 more service." "Half as much down time due to re-wiring." These are typical comments by users. Change over one scraper to Tuffy. Test its extra yardage handling ability and you'll change to Tuffy Scraper Rope on your whole fleet.

Tuffy is Tailored to Take:

- Greater Drum Crushing Abuse
- Sharper Bends Over Small Sheaves
- Angle Pulls Thru Swiveled Sheaves
- Crawling On Guide Roll Flanges
- Heavy Line Pull . . . Rapid Line Speed
- Multiplied Shock of Load On Slack Line

Tuffy—The Single Answer To All Scraper Rope Problems

For longer runs and lower costs, mount Tuffy reels on your scrapers. The name Tuffy, the diameter and the length—that's how simple it is to buy scraper rope for new yardage records. Remember, Tuffy is the name to remember.

union Wire Rope corporation

2156 Manchester Ave., K. C., Mo. Send Complete details on Tuffy Scraper Rope.

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Send information on:

- ☐ Slings
- ☐ Draglines
- ☐ Scraper Rope
- ☐ Union-formed wire rope

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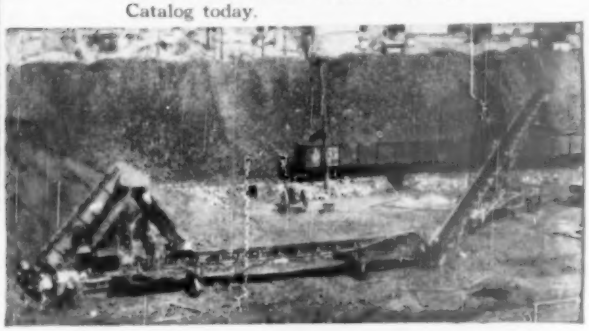
HAISS LOADER IN ACTION
(Note the full Buckets)

HAISS
•BUCKET LOADERS

Load 3 To 8 Yards Per Minute

Haiss Bucket Loaders are used for excavating — rehandling — stripping and loading: sand — gravel — stone top-soil — coal and similar materials. Self Propelled, Self Feeding — wheel or crawler mounted — One man operation. Write for Bucket Loader Catalog today.



HAISS LOADER and
Conveyors Combination

•CONVEYORS portable or stationary

HAISS FLAT or TROUGH
BELT CONVEYORS
(Model 481 and 482)

For all bulk materials. Mounted on "V" or mast truck with swivel wheels. Ask for Bulletin No. 481 for coal or coke handling—Bulletin No. 482 for sand and gravel, etc.

CAR UNLOADERS

HAISS CAR UNLOADERS
(Models 483 and 484)

Belt and drag types for low-cost undercar unloading from hopper bottom cars. Ask for bulletin No. 483-4.

HAISS SECTIONAL CONVEYORS

Made in easily assembled sections. Portable as above or stationary as below — for handling all bulk materials — Ask for Bulletin 487.

•BUCKETS

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Experienced Haiss representatives are located in all principal cities. For further information, write, phone or wire.

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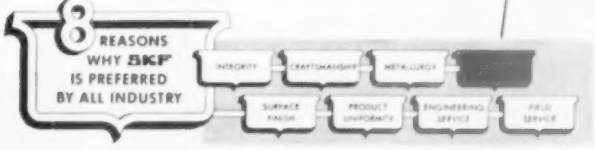
NEVER TOO MUCH... NEVER TOO LITTLE BUT **ALWAYS** JUST RIGHT

because of TOLERANCE CONTROL

Another reason why industry prefers SKF

Remember leapfrog? How you used to have to skim over just right? Well, it's very much the same thing in specifying bearings. You don't want tolerances too great... and you don't want tolerances closer than the job demands. But you want to be sure that tolerances are *right*... are *always* properly controlled... *always* meet established standards. SKF adheres rigidly to these standards. Ceaseless vigilance in every stage of production assures complete control of tolerance throughout the entire manufacturing cycle. You can always be sure that any SKF Bearing will exactly meet your requirements... and will meet them again and again. Never forget, either, that *tolerance control* is only *one* reason why SKF Bearings will help you build equipment which, through smooth, economical performance, helps develop greater acceptance for your product. **SKF** INDUSTRIES, INC., PHILADELPHIA 32, PA.

SKF
Ball and Roller Bearings



Inventors and Pioneers of the Self-Aligning Ball Bearing and Spherical Roller Bearing

7050

Why are more and more large operators reordering P&H Electric Shovels? The reason is clear — lower operating costs. They've piled up the proof with Added Values like these:

1. "*Magnetorque*"* *Drive*— hoists the dipper with electro-magnetic power — lowers with less than half the usual inertia to overcome. It's faster.
2. "*Magnetron*" *Control*—entirely eliminates control fingers and contactors. It's simpler, more dependable.
3. *Independent Propel*—eliminates sliding gears brakes, clutches and their controls — provides faster move-up.
4. *Air-filtered cab*—pressurized to allow only clean, fresh air to enter — no dust to damage electrical equipment.

Yes, proof on the job makes P&H the choice of discriminating buyers — leads to one repeat order after another. Investigate before you invest.

* T. M. of the Harnischfeger Corporation for Electro-Magnetic Type Clutch

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4465 West National Avenue
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HARNISCHFEGER CORPORATION

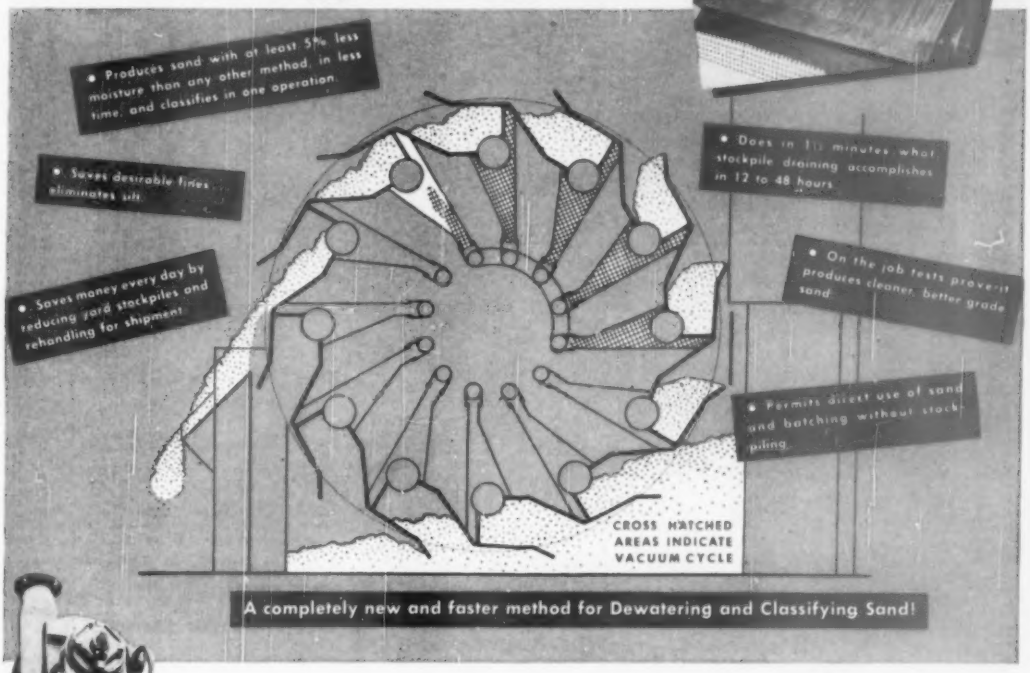
Every third P&H Electric Shovel sold is a repeat order

LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENT

CONVEYCO

VACUUM SAND DEWATERING UNIT

Means Bigger Profits!



HOW CONVEYCO DEWATERING UNIT WORKS

Conveyco now offers the greatest improvement in sand dewatering and classifying equipment in over 30 years. A patented process based on the principle of bottom draining and vacuum has been applied to a wheel. Vacuum drawn from the center of the wheel pulls water through round self-cleaning brushes at the back of the buckets. This self-cleaning filtering system retains desirable fines while producing 5% drier sand than by other commercial methods. The Conveyco unit occupies less space than previous types of equipment. Amazingly profitable for large or small sand and gravel plants.

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THE CONVEYOR CO.
3260 East Slauson Ave., Los Angeles, California

Gentlemen: Please send me booklet giving complete details on the Conveyco Sand Dewatering and Classifying machine.

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GET SPECIFICATION SANDS WITH WEMCO SAND PREPARATION MACHINES

No. 48 WEMCO Sand Preparation Machine.

Today's market demands **clean, dry** sands – sands that meet exacting specifications.

WEMCO Sand Preparation Machines are specifically designed to produce:

- **CLEANER, DRIER SANDS**
  ...scrubbing effect of WEMCO spiral and dewatering action of unit remove deleterious matter and water.
- **SPECIFICATION SANDS**
  ...with maximum recovery of desired sands. A machine to meet every need. Controls excess fines, slime and medium fractions.
- **MAXIMUM PRODUCTION**
  ...exclusive WEMCO design provides maximum sand raking and overflow capacities. Automatic operation assures continuous production with minimum attendance.

Reduced operating and maintenance costs are assured – WEMCO Sand Preparation Machines are noted for simplicity of operation and durability of construction.

No. 48 WEMCO Sand Preparation Machine operating at the plant of Pacific Coast Aggregate, Inc., Centerville, Calif.

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WEMCO Sand Pumps and parts are available for immediate shipment. For prompt delivery call your nearest WEMCO office.

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WHEREVER your plant is located — from Boston to San Diego — you can get prompt, skillful motor repair service from a nearby Allis-Chalmers Certified Service Shop. These shops, selected for their reliability and excellent repair facilities, now cover every major industrial area in the country.

When you need work done on motors, transformers or control — when you're looking for a shop that can help you cut lost production hours and get you rolling again, fast—call the A-C Certified Service shop nearest you.

These shops are hand-picked from the best independent shops in your locality. They meet exacting A-C standards — use factory-approved methods and parts to assure like-new motor performance.

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For expert service — for new motors from ½ to 25,000 hp — give your nearest A-C Authorized Dealer or Sales Office a call!

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PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

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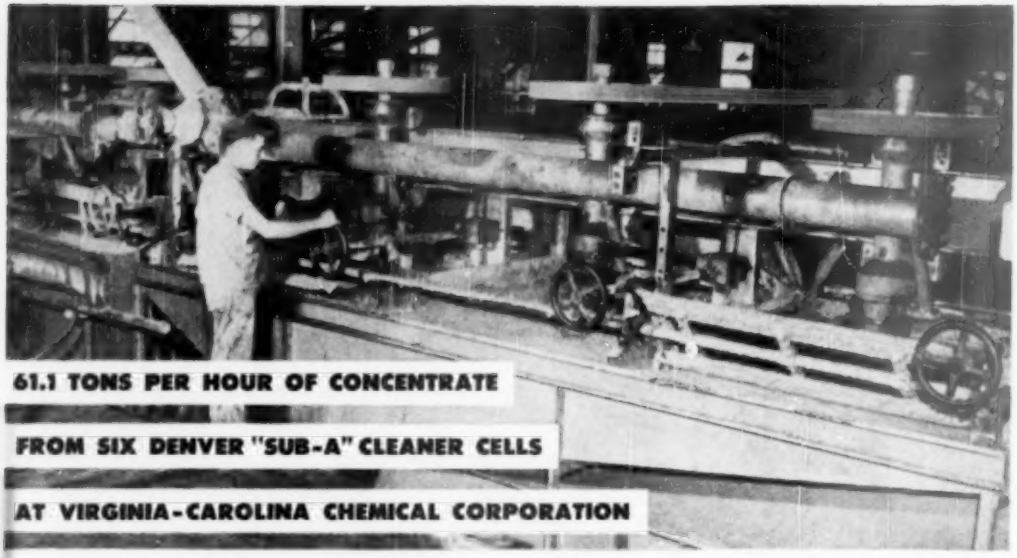

61.1 TONS PER HOUR OF CONCENTRATE

FROM SIX DENVER "SUB-A" CLEANER CELLS

AT VIRGINIA-CAROLINA CHEMICAL CORPORATION

LET'S LOOK AT THE RECORD

This published account in a recent issue of *Rock Products* proves again the superiority of and preference for Denver "Sub-A" Flotation Machines.

Originally there were 10 of the 54-in. Denver "Sub-A" cells as roughers and six cleaners. The additions bring the cells up to 15 roughers and 9 cleaners and all are Sub-A's. The new set-up is expected to produce 85 tons of cell concentrates per hour. This is 9.5 tons per hour per cleaner. The original six cleaners produced 61.1 tons of concentrates per hour or 10.2 tons per hour. At this tonnage the grade of concentrates produced is kept up to the high standards set by Virginia-Carolina Chemical Corporation. We are inclined to think that for the number of cells used, the tonnage per hour of concentrates produced makes this plant outstanding.

A DENVER "SUB-A" WILL SOLVE YOUR PROBLEM

No matter what your flotation problem—metallic or non-metallic... concentrate or bulk flotation—there is a standard Denver "Sub-A" designed to do the job ... efficiently, economically.

FLOWSHEET FLEXIBILITY IS IMPORTANT

The extreme flexibility of the Denver "Sub-A" Flotation Machine makes it possible to obtain custom built results with *standard Denver Equipment.*

Write *Today* to your "Flotation Engineers" at any of the Deco offices listed below for more information and tested results.

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Complete Mill Equipment from Testing... To Feeder... To Dryer

"The firm that makes its friends happier, healthier and wealthier"

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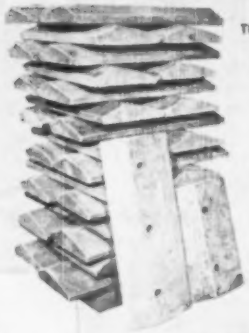
Specify the steel that defies wear

TISCO *Hadfields* MANGANESE STEEL

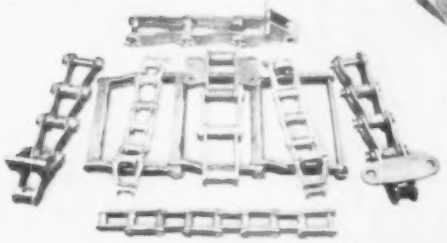
"THE HARDER IT WORKS, THE HARDER IT GETS"

TISCO Manganese Steel Pulverizer and Hammermill Parts

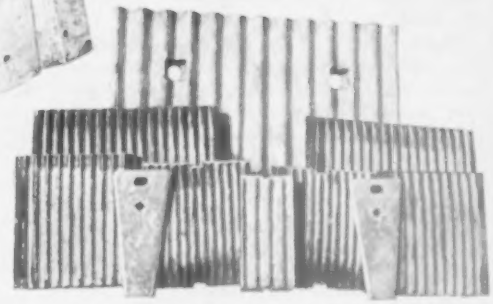


TISCO Manganese Steel Ball Mill Liners

TISCO Manganese Steel Dipper Teeth



TISCO Manganese Steel Chain for Conveyors, Elevators, Dredges, etc.



TISCO Manganese Steel Jaw Plates for Crushers

YES . . . TISCO Hadfields Manganese Steel actually gets harder, more wear resistant under the heavy impact and abrasion of crushing, hammering, pulverizing and handling rock products. Since its introduction over 50 years ago, when it made the crushing of trap and granite rock commercially possible, TISCO has proved its durability and low cost in the production of millions of tons of aggregate.

Today, TISCO Hadfields Manganese Steel continues to be the No. 1 steel for wear resistance in the quarrying industry. Long experience has developed casting and inspection techniques that assure sound castings.

When ordering new equipment or replacement parts from your supplier, be sure to specify TISCO Manganese Steel. Consult our metallurgists on any special requirements.

OTHER TAYLOR-WHARTON PRODUCTS

Manganese-Nickel Steel Weld Rod
High Pressure Gas Cylinders
Frogs, Switches, Crossings
Special Trackwork for Industries and Mines

FOUNDED TW 1742

TAYLOR-WHARTON IRON AND STEEL COMPANY

HIGH BRIDGE, N. J. EASTON, PA.

TISCO *first in* MANGANESE STEEL

announcing

the CP Light Wagon Drill

Here's a new aid to faster drilling, the G-150 *Light* Wagon Drill. With it and the new 59-pound CP Sinker, or the 3-inch CP Drifter, you can increase footage in benching or toeholing up to 100% over hand-held methods. 6-foot steel changes materially increase actual throttle time.

A new, compact, cone gear drive—exclusive with CP—has 66% more tooth contact than conventional worm gearing. This design insures longer life because of greater load carrying capacity.

Holes are drilled easily at any angle. Positive, uniform feeding pressure insures faster unit drilling speed with lower air consumption per foot drilled. Powered steel puller avoids wrenching of steel and loss of holes in bad drilling ground.

Write for Bulletin SP-3010 giving specifications in detail.

CHICAGO PNEUMATIC TOOL COMPANY

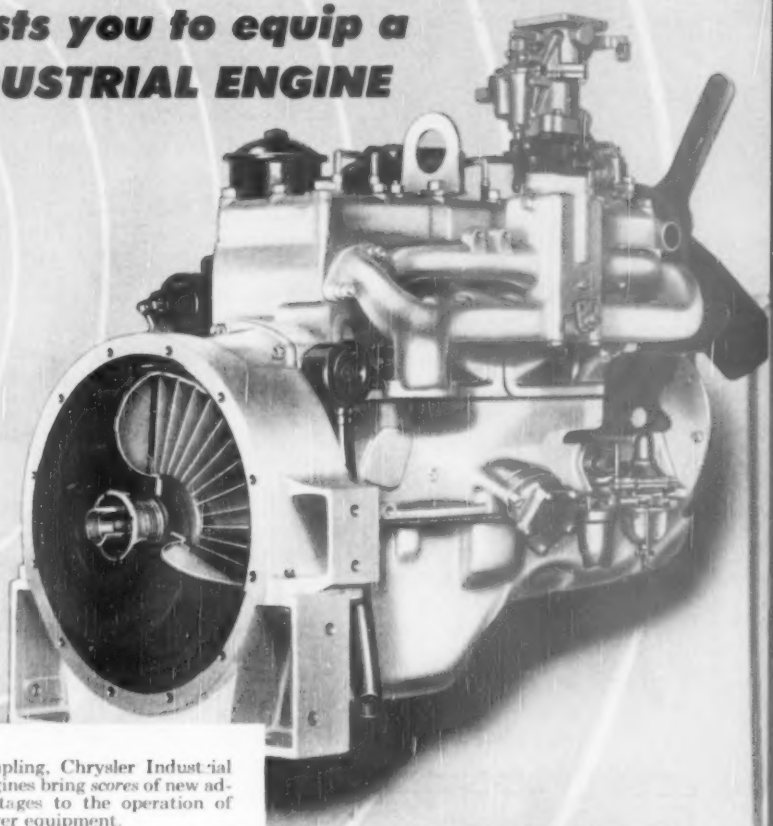
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

IT'S AMAZING

how little it costs you to equip a CHRYSLER INDUSTRIAL ENGINE with . . .

gýrol Fluid Drive!



Does operation of your equipment require frequent clutching and de-clutching?

Is your equipment subjected to damaging shock loads? Is it desirable to speed up your engine close to torque peak with the output shaft turning at a lower speed?

Do shock loads sometimes stall your engine or cause failure of drive train parts? Would gradual oil-smooth acceleration improve your operation?

If your answer is "yes" to any of these questions, better investigate Chrysler Industrial Engines now! With gýrol Fluid Coupling, Chrysler Industrial Engines bring *scores* of new advantages to the operation of power equipment.

Chrysler's famous gýrol Fluid Coupling has been proved on more than a *million* Chrysler, DeSoto, and Dodge passenger cars and trucks over a period of 11 years. *Proved* on scores of industrial applications.

Its cost is amazingly low! *Actually only a few dollars more than the cost of the conventional flywheel which it replaces!* For more information, see your nearest Chrysler Industrial Engine Dealer, write us, or *mail the coupon today!*

CHRYSLER

Industrial Engines and Power Units

HORSEPOWER WITH A PEDIGREE

As the driver turns inside the sealed steel drum, the confined oil produces a powerful swirling out-thrust. Instantly the Runner receives the impulsion and transmits smooth power to the load.

O-2

INDUSTRIAL ENGINE DIVISION, CHRYSLER CORPORATION
12200 E. Jefferson, Detroit 31, Michigan

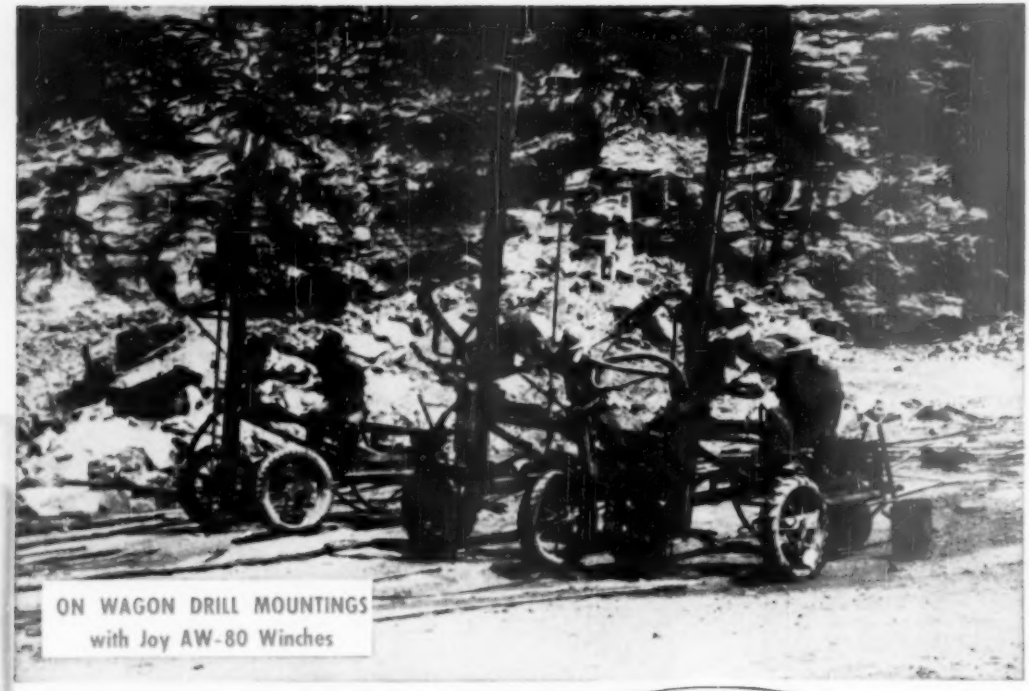
Send us full information on Chrysler Industrial Engines with gýrol Fluid Coupling for use on _____ equipment.

NAME _____

COMPANY NAME _____

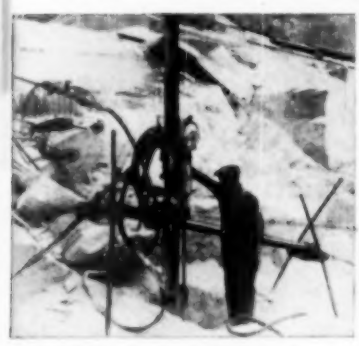
STREET _____

CITY _____ STATE _____



ON WAGON DRILL MOUNTINGS
with Joy AW-80 Winches

Put JOY SILVER STREAK DRIFTERS TO WORK ON YOUR JOB—



ON QUARRY-BAR MOUNTING

Watch daily footage *INCREASE* and costs per foot go *DOWN!*

JOY Silver Streak Drifters feature the exclusive *Dual Valve* with positive cushion control. It gives a harder, more powerful punch—literally makes air do more work. What's more, JOY Drifters *last longer*—give you more feet of hole with less maintenance. Exclusive *cadmium plating*, inside and out, inhibits rust, prevents scoring during run-in, and at the same time, adds power by permitting closer piston tolerances. ● Ask for a trial demonstration on JOY Drifters—the T-500, T-350 or T-400—*prove their all-around superiority right on the job!*

Write for Bulletin, or

Consult a Joy Engineer

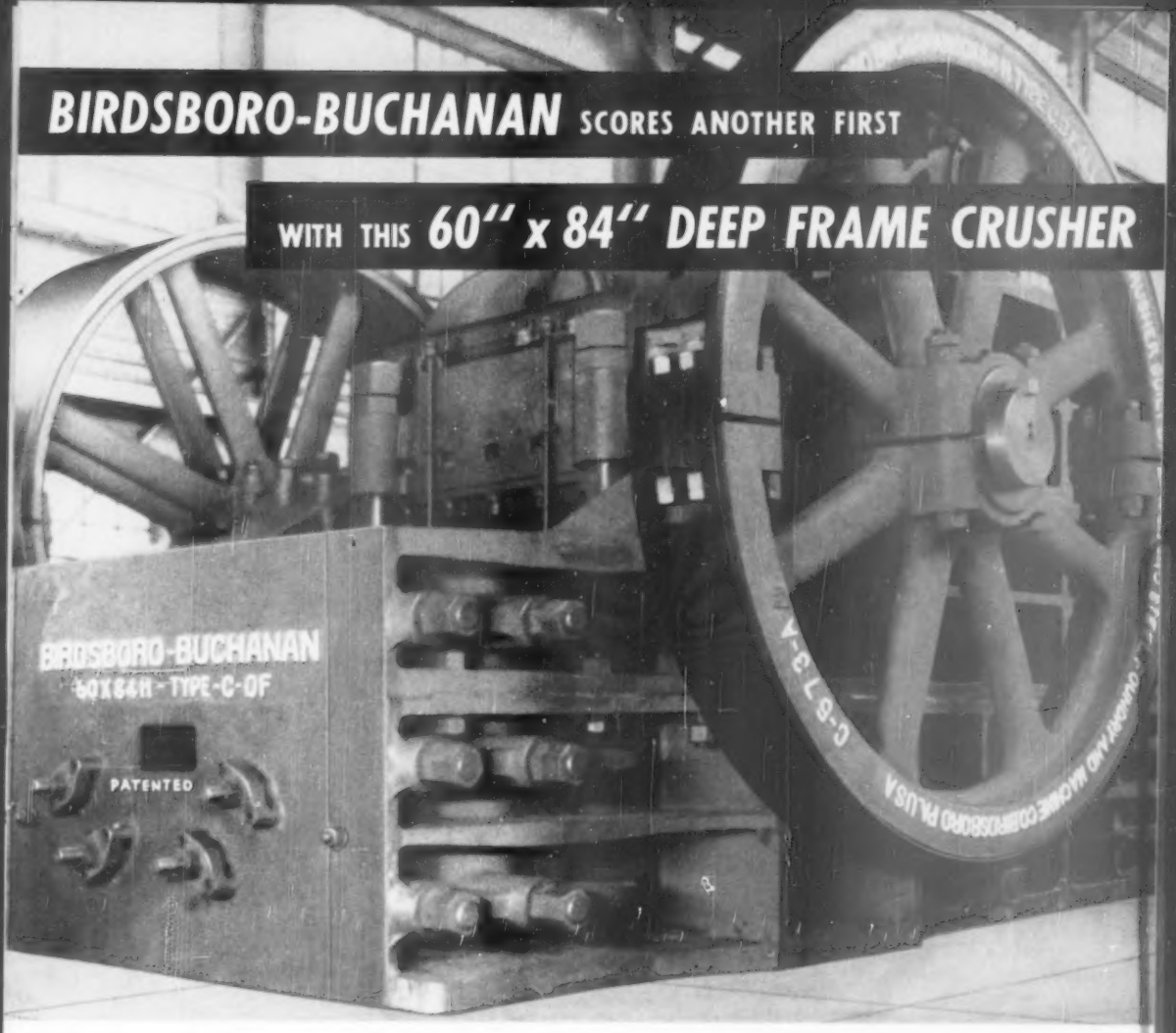
JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

BIRDSBORO-BUCHANAN SCORES ANOTHER FIRST

WITH THIS 60" x 84" DEEP FRAME CRUSHER



Birdsboro-Buchanan was first to engineer and build the

Modern Deep Frame Jaw Crusher

NOW Birdsboro-Buchanan is *first again* with the delivery of this rugged, all cast steel 60"x84" crusher—the LARGEST DEEP FRAME CRUSHER EVER BUILT.

All the advanced features developed by Birdsboro engineers are built into this mammoth machine—features which insure dependable operation, low maintenance and the crushing of greater tonnages to smaller sizes at lower cost.

There's no need to gamble on your primary crusher requirements with Birdsboro engineers ready to put their long experience to work for you. Don't hesitate to call on us for help in arriving at a practical solution to your crushing problems.

WORLD-WIDE AGENT REPRESENTATION
Contact home office for address of nearest representative

CANADIAN REPRESENTATIVE AND MANUFACTURER
JOHN INGLIS CO., LTD.
TORONTO, CANADA

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY · BIRDSBORO, PA.
Offices in: Birdsboro, Pa. and Pittsburgh, Pa.

DESIGNERS and BUILDERS OF: Crushing Machinery · Rolls · Steel Mill Equipment · Hydraulic Presses · Steel Castings · Special Machinery

BIRDSBORO

BUCHANAN JAW CRUSHERS

DIAMONDS to GRAVEL!

Many Non-Metallic Minerals Are Now Being Upgraded *Accurately and Economically* by Heavy-Media Separation

Each year the record of results becomes more conclusive: ***Heavy-Media Separation is the low cost way to upgrade plus 10 mesh non-metallics . . . so low cost that it can be profitably used to upgrade gravel, cement rock and similar materials with a narrow per-ton profit margin.***

Reasons-why are inherent in the efficiency and economy of the process. Results are confirmed by the constant increase in both tonnage and scope of application. Over 70 plants, with a combined capacity of many millions of tons per year, are now operating and being built.

What Heavy-Media Separation Does.

Heavy-Media Separation separates valuable mineral from unwanted deleterious material by virtue of their differences in specific gravity. Separation takes place continuously and automatically in a closely-controlled, recoverable fluid medium whose specific gravity is maintained between that of the wanted and unwanted fractions of the feed. Actual plant tests show that Heavy-Media Separation closely duplicates "heavy-liquid" results over a wide size-range and at any predetermined gravity from 1.25 to 3.75. It is the only low-cost process that provides automatic, continuous and complete separation of large and variable amounts of unwanted materials, regardless of how the feed fluctuates.

How Heavy-Media Separation Works.

You set the gravity of the Heavy-Media pool (a mixture of finely-ground magnetite or ferro-silicon and water) at the specific gravity you need to get the quality you want. From then on the Heavy-Media Separation unit maintains the separating gravity within ± 0.01. The light material floats, the heavier material sinks. Separation is accurate, automatic, continuous . . . as certain and dependable as the force of gravity. The "heavy medium" is washed off both the wanted and unwanted fractions, recovered by magnetic separators and continuously fed back to the separating vessel. Some does get lost. But some plants use as little as $\frac{1}{4}$ lb. of medium make-up per ton of feed to maintain the separating gravity at exactly the right point for precise separation.

If your shipping specifications change, the operating gravity can be quickly and easily changed. Labor costs are low. Hand labor may be reduced or eliminated. Equipment is essentially standard units, proved by years of use. First cost is seldom a deterrent.

AMERICAN *Cyanamid* COMPANY

"Custom-Built" and Semi-Portable "Package Plants" Available.

Several types of Heavy-Media Separation plants are available — all functioning on the same principles but differing in design details. For extensive mineral deposits operated at high tonnage, "custom-built" Heavy-Media Separation plants can be built through the accumulated experience of several large engineering-construction firms.

For limited deposits and for construction jobs, pre-fabricated semi-portable "packaged plants" with capacities up to 200 tons per hour are available on a purchase or rental basis. These can be erected on the site within a few weeks by a small crew and can be dismantled, moved and re-erected with no more difficulty than other major pieces of construction machinery.

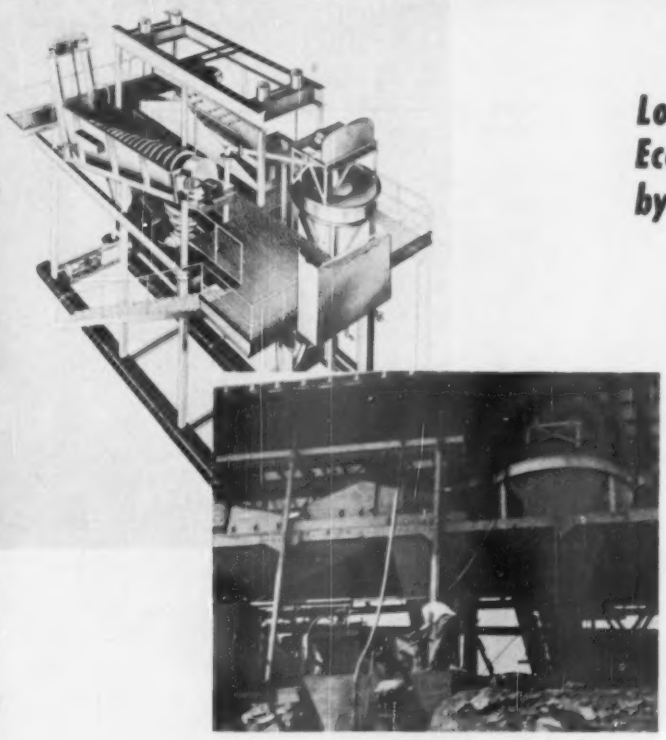
How Cyanamid Can Help You.

Cyanamid does not build or lease Heavy-Media Separation plants. We furnish technical service in the applicability of Heavy-Media Separation to your materials, cooperate with engineers of your choice in the design and construction of plants, and assist in tuning up the installation for most efficient operation.

We are prepared, after preliminary discussion of your problem without cost or obligation, to run carload tests on your material in the continuous unit Heavy-Media Separation pilot plant in the Cyanamid Mineral Dressing Laboratory at Stamford, Connecticut. We can also give you the benefit of the considerable amount of commercial data resulting from the treatment of many millions of tons by Heavy-Media Separation on a long list of metallic and non-metallic minerals.

Take This Step Now.

It costs nothing to become fully informed on Heavy-Media Separation and to learn how it may help you to improve quality, lower mining costs, widen your market and otherwise put you in a position to operate more profitably in the competitive days ahead. The first step is to send for *Mineral Dressing Notes #14, Heavy-Media Separation*, a 48 page illustrated, technical booklet explaining the process in detail. The coupon below is for your convenience.



Low-Value Minerals Economically Treatable by Heavy-Media Separation

Andalusite	Gypsum
Barite	Iron Ore
Cement Rock	Magnesite
Coal	Pearlite
Diamondiferous Ground	Phosphate Rock
Fluorspar	Potash
Garnet	Salt
Gravel	Spodumene

And very probably many, many more!

30 ROCKEFELLER PLAZA
NEW YORK 20, NEW YORK

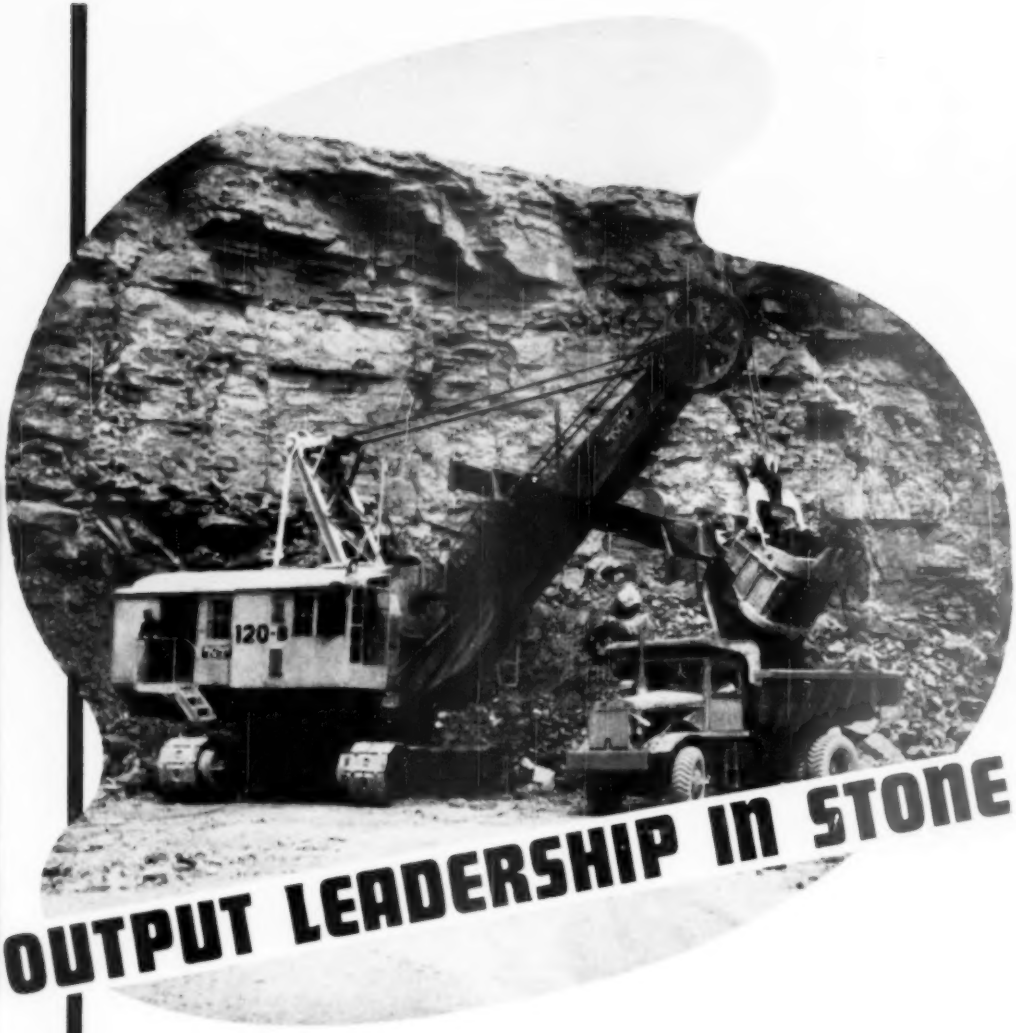
Please send without obligation __ copies your 48 page illustrated book: Mineral Dressing Notes #14, Heavy-Media Separation.

YOUR NAME _____

COMPANY _____

ADDRESS _____

_____



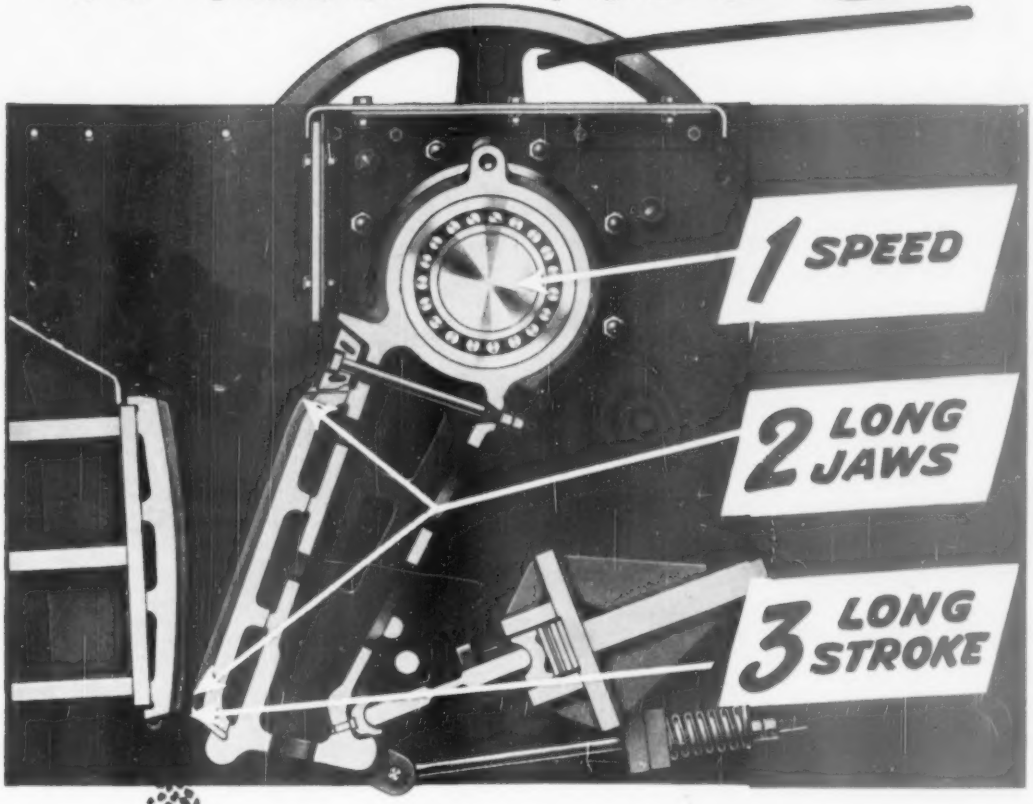
OUTPUT LEADERSHIP IN STONE

Put Bucyrus-Eries to work on your quarry operations and you'll see why they are first choice among owners and operators the world over. For example, the 5-cubic yard 120-B's scientific balance of strength and weight, speed and power, ease and precision of control, create a standard of loading efficiency unmatched by any other make. Its reliability for profitable output results from the *years ahead* design made possible by nearly 70 years of Bucyrus-Erie experience and leadership in the excavating field.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

It Takes ALL 3



to put the maximum amount of rock through a jaw crusher

No other crusher *excels* the A-W in *any one of the three.*

No other crusher *equals* the A-W in *all three.*

That's why no other crusher turns out as much rock.

AUSTIN-WESTERN COMPANY • AURORA, ILLINOIS, U. S. A.

Austin-Western

Fast Crowd . . .

With the Koehring heavy-duty 605, your operator can crowd at full speed up through the bank. Heavy cast casing on each side of wide boom foot absorbs jars and strains of fast rock handling. Big 20" power clutch requires only 7 lb. average lever pull, yet the operator always retains the "feel" of load.

Fast Retract . . .

Powerful 26" double-band retract clutch gives fast retract speed with perfect control. Double-fulcrum units in control-lever linkage eliminate troublesome over-travel of crowd and retract, as well as swing and traction clutches. Speeds up every shovel cycle, cuts operator fatigue . . . and boosts yardage every hour.

Fast Swing . . .

You can use full throttle on the swing, keep swinging fast all day. Big 605 is fast . . . smooth-swinging, because light cylinders of double-band clutches, not heavy drums, are accelerated . . . cool-running, because finned drums rotate constantly. Fast action [illegible]

KOEHRING COMPANY

BIGGER PAYLOADS

- **Faster operation**
- **Lower maintenance costs**
- **Longer life**

Here's why:

1 All-welded construction gives lower center of gravity . . . improves bucket balance . . . concentrates digging power on lips and teeth for maximum penetration and capacity loads every time.

2 Weight, saved in other parts by welding, is put back into thick sides, lips and bottom, where extra strength is needed to take constant pounding of hard, fast drops. Strain points are reinforced.

3 Hard manganese cutting edge, welded to heavy lips stays sharp . . . gets tougher with use. Long wearing, maintains big capacity payload digging efficiency.

4 Stones and dirt from heaped capacity loads can't get at sheaves, cables and lower sheave block. Open lower sheave frame keeps sheave spaces clean; material cannot collect under sheaves.

5 Every big closing sheave runs on two needle bearings, which eliminate friction losses . . . keeps sheaves free-running. Effective seals keep dirt and moisture out.

6 Johnson clamshell buckets dump fast and clean . . . not a single projecting rivet or bolt head inside the smooth, all-welded clams to catch and hold clay or mud. Materials slide out easily.

Ask your Johnson distributor about the Wide Rehandling, General Purpose and Heavy-Duty Digging types available in sizes from ⅜ to 2½ yards.

C. S. JOHNSON COMPANY

CAPACITY GOING UP...

COSTS COMING DOWN...

WITH REX ELEVATOR CHAINS and BUCKETS!

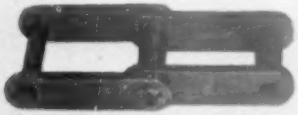
With Rex Elevator Chains, Sprockets and Buckets, you can increase elevator capacity . . . reduce operating and maintenance costs. Because there is a Rex Chain, Sprocket or Bucket that exactly fits every type of elevator service, you can select the equipment that will best stand up under the service requirements . . . add capacity through the elimination of premature failures that hold up production.

Each Rex Elevator Chain, Sprocket and Bucket is designed specifically for the conditions under which it must operate. Chain attachments are designed for the chain with which they are to run —for equal load distribution and long life. Speeds, capacities, type of material handled, daily number of operating hours are basic considerations that determine the type of chain to be used.

For help in selecting the right chain, sprocket or bucket for your elevators, consult your local Rex District Office or write direct to Chain Belt Company, 1649 West Bruce Street, Milwaukee 4, Wis.

REX LEY BUSHED CHAINS
For moderate loads and speeds, exceptionally severe abrasive service

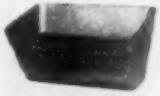
REX DUROBAR COMBINATION CHAINS
For general, moderate load, slow speed service



REX CHABELCO CONVEYOR CHAINS
For heavy loads, high speeds, severe abrasive conditions

REX CHABELCO DRIVE CHAINS
For efficient, low-cost power transmission

REX STYLE "A" BUCKET
For General Service



REX STYLE "AA" BUCKET
For heavier, more abrasive materials

REX TEMPERIM SPROCKETS
With hardened teeth and rims for long service under abrasive operating conditions.

CHAIN BELT REX COMPANY

DRIVE AND CONVEYOR CHAINS

FIRST FOR LASTING SERVICE

now available from stock

SPECIAL trade-in offer

to owners of 15* year and older Mack trucks

The time has come when it will pay you to pension-off your "Old Faithful" and modernize your hauling with a new Mack truck. *Sure there's years more work left in your Mack.* That's proved by the thousands of Macks on the road well over 15 years old. As an old friend, we want you to get the benefits of a modern Mack. We want you to get the advantage of Mack's special trade-in allowance offer.

Why it will pay you to modernize NOW with Mack

1. *You may never again be able to trade in your 15 year or older Mack* at so good a price—for the simple reason that your dollars today will buy more than they ever did before.

2. *New Macks have the built-in stamina and endurance* that has made Mack famous—PLUS tested, new features that insure still lower hauling costs.

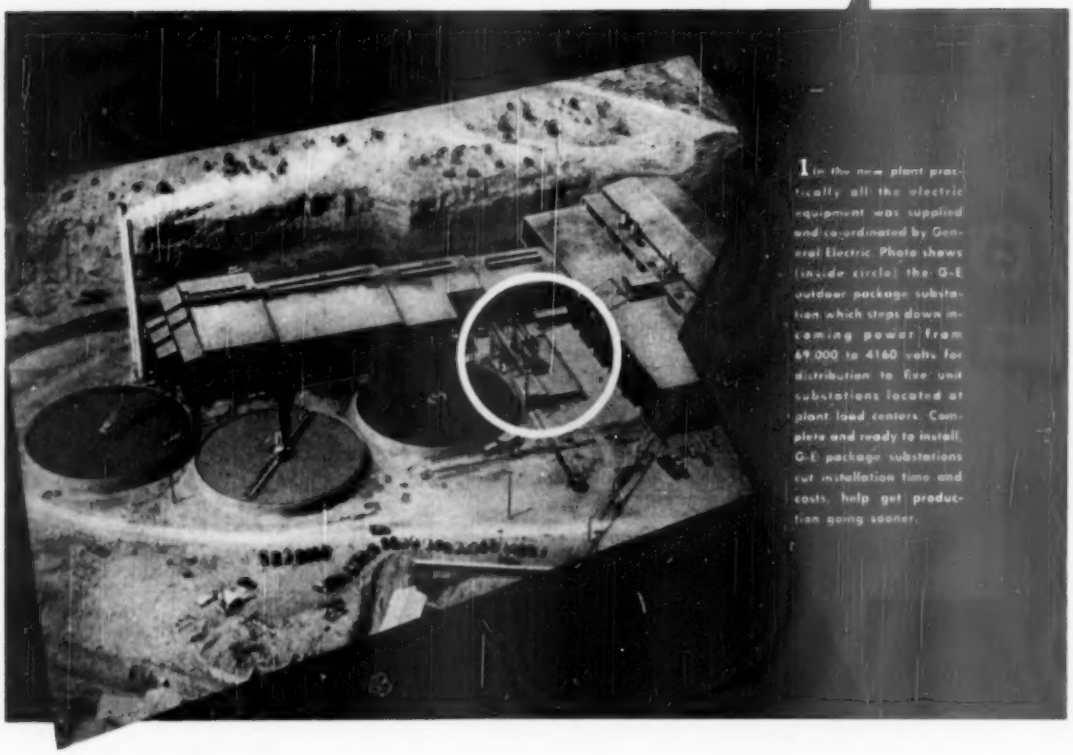
3. *Remember, when truck-price is the battleground of purchase . . .* proved quality, proved dependability, proved longest life, PROVED MOST TON-MILES PER DOLLAR, are the only yardsticks by which you can truly measure the purchasing power of your truck money.

So get in touch with your nearest Mack branch or dealer today. Ask for the trade-in price on your old Mack.

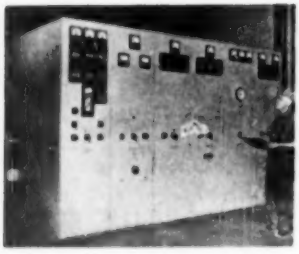
*** At the last official count of R. L. Polk, there were 12,970 MACK TRUCKS 15 years and older still in operation.**

Modernize with Mack

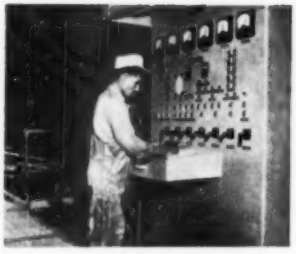
Mack Trucks, Inc., Empire State Bldg., New York 1, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.



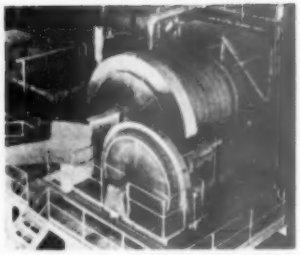
1 In the new plant practically all the electric equipment was supplied and co-ordinated by General Electric. Photo shows (inside circle) the G-E outdoor package substation which steps down incoming power from 69,000 to 4160 volts for distribution to five unit substations located at plant load centers. Complete and ready to install, G-E package substations cut installation time and costs, help get production going sooner.



2 The old power system is interconnected with the new purchased power system by means of this 2400-volt, 5000-kva G-E Metal-Clad switchgear. Containing adequate interrupting capacity for short circuit protection, these G-E units are completely metal enclosed for personnel safety.



3 Here is one of several G-E control stations at which all related processes of a given department are closely co-ordinated by one operator. Combining indicating instruments and signal lights with pushbutton stations and selector switches, they permit efficient use of manpower.



4 Driving this primary wet ball mill (capacity 235 barrels per hour) is a 500-hp, 4160-volt G-E synchronous motor. Meeting the highest standards of performance, G-E synchronous motors are extensively used for maintaining exact speeds and for improving power factor in many cement plants.

You can put your confidence in—

GENERAL ELECTRIC

658-1

CO-ORDINATED ELECTRICAL SYSTEM PAYS OFF!

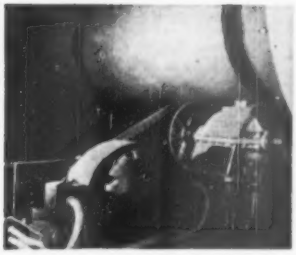
Ideal's new Portland cement plant uses General Electric co-ordinated drives throughout—from primary crushers to packing conveyors—for operating economy.

At the end of their new plant's first year of successful operation, the management of Ideal Cement Company at Portland, Colorado, is well pleased with their General Electric "packaged" electrical system.

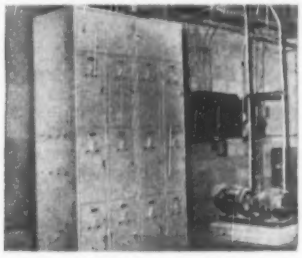
Practically all the components in this system were supplied by General Electric, a company which manufactures *all* the electrical components you require.

G-E application engineers familiar with the problems of the cement industry, and assisted by specialists in particular product lines, carefully selected, co-ordinated, and installed the components as a system—complete and ready to go!

Whether you plan a complete new plant, or the modernization of an existing one, you'll save time and money by consulting your G-E representative first. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



5 This 125-hp, 440-volt G-E motor drives one of the plant's two rotary kilns, each 400 feet long. Built to require minimum maintenance, these motors are not affected by the heat of the kiln. Other G-E induction motors in this plant operate conveyors, pumps, fans and crushers.

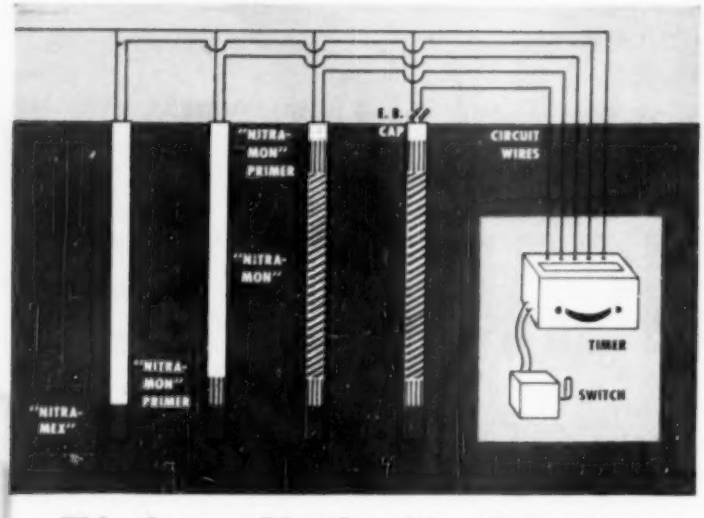


6 Controlling a number of 440-volt G-E motors in the new crushing plant is the G-E Cabinetrol* shown. Compact and factory-assembled, it provides conveniently centralized low-voltage motor controls. Its rigid steel enclosure promotes personnel safety, minimizes disturbances due to dust.

*Reg. U. S. Pat. Off.

7 This G-E Limitamp control lineup contains starters for 4 G-E 4160-volt synchronous motors, two rated at 1000 hp, two at 500 hp. Combining high-voltage motor control with built-in short-circuit protection, these controllers will protect their connected drive up to ½ million kva fault level.

Everything you need
to cut rock product costs
. . . electrically!



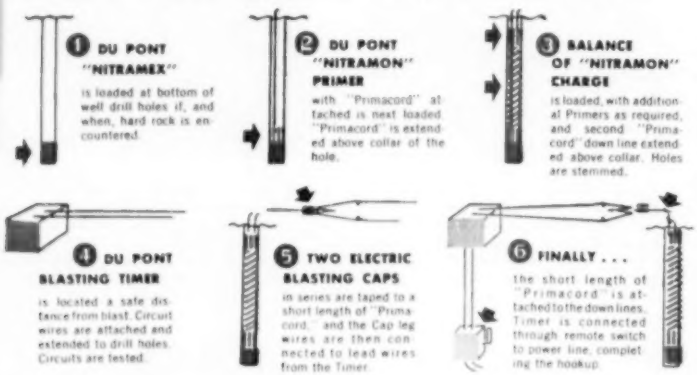
This Quarry Blasting Plan Promotes Safety, Efficiency and Economy

It's safer than conventional methods because the plan utilizes "Nitramon" and "Nitramex"... the safest blasting agents available. These are fired with "Nitramon" Primers, which, in turn, are initiated with "Primacord." No caps are placed in drill holes.

It's more efficient because it creates a split-second blast with an unusual "peeling" action that greatly reduces ground vibration. It's a time-saver because charges can be safely loaded far in advance of firing. And wet conditions are no problem.

It's economical because the resulting blast improves fragmentation. Less secondary blasting is required; back break is reduced. Digging operations are speeded up and costs held to the minimum.

IT'S AN EASY PLAN TO FOLLOW . . . as the step-by-step sketches below show:



Ask the Du Pont Explosives representative in your area for complete information about this safer, more efficient and economical plan for quarry blasting. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

DU PONT EXPLOSIVES

BLASTING SUPPLIES AND ACCESSORIES

Du Pont Blasting Timer Creates Split-Second Blast that Reduces Vibration . . . Improves Breakage

The Du Pont Blasting Timer offers a selection of 15 circuits with delay intervals from 0.010 to 0.025 second in increments of 0.005 second. This extremely wide range permits a split-second blast that, in effect, "peels" the rock from the quarry face . . . resulting in less vibration, better fragmentation and reduced back break.

The Blasting Timer is so constructed that either 110, 220, 440, or 550 volt circuits may be used with assurance of excellent results.

See the Du Pont Blasting Plan Exhibit and the Blasting Timer in Booth 69 at the

NATIONAL CRUSHED STONE ASSOCIATION CONVENTION

in Chicago, Jan. 30 — Feb. 1, 1950

"NITRAMON"*

Quarrymen everywhere approve "Nitramon" because it is so safe. It cannot be detonated with commercial blasting caps, or by fire, friction, falling objects, or even the impact of ball ammunition. Charges are readily detonated with a "Nitramon" Primer . . . itself relatively insensitive. "Nitramon" contains no nitroglycerin and is non-headache-producing.

"NITRAMEX"†

A companion product to "Nitramon" that is designed for shooting especially hard rock formations.

Listen to "Cavalcade of America" Tuesday evenings—8 o'clock—NBC

*Reg. Trade Mark for ammonium nitrate blasting agent

†Trade Mark for Du Pont ammonium nitrate blasting agent

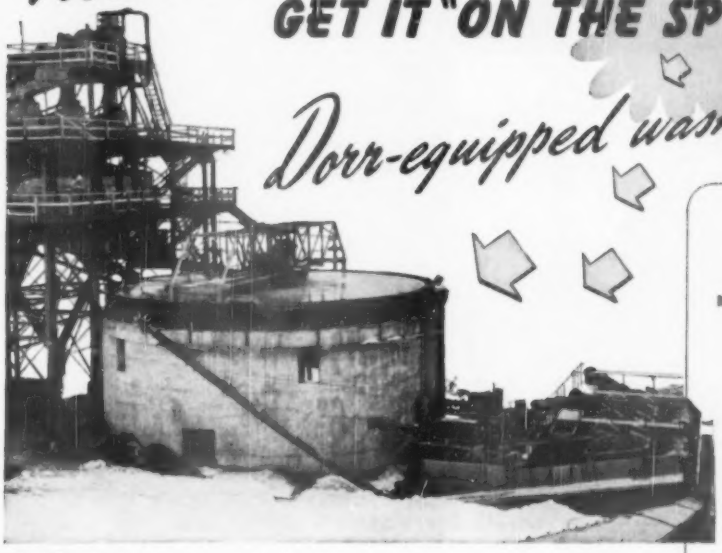
DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Need concrete sand...

GET IT "ON THE SPOT" WITH A

Dorr-equipped washing plant



CONCRETE SAND for dam construction . . . or any heavy construction project . . . can be produced at the working site with a Dorr-equipped washing plant. Here are three typical examples . . . with capacities ranging from 50 to 500 tons per hour.

FLOWSHEET #1—50 to 60 tons per hour

Simplicity itself—rod mill reduces the raw material . . . Dorr Classifier washes and separates finished sand from silt and water.

FLOWSHEET #2—50 to 150 tons per hour

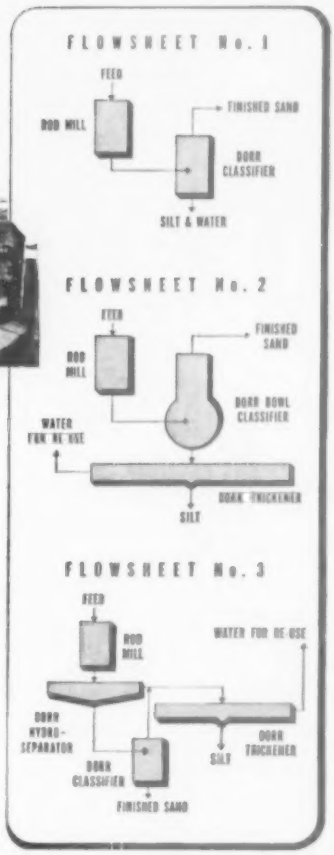
Rod mill reduces raw material . . . Dorr Bowl Classifier washes and separates finished sand from larger volume of silt and water. Dorr Thickener may be added to settle out silt and recover water for reuse.

FLOWSHEET #3

150 to 500 tons per hour

Rod mill reduces raw material . . . Dorr Hydroseparator makes preliminary separation of sand and silt . . . Dorr Classifier makes final separation, delivering finished sand as rake product. Dorr Thickener recovers water for reuse from Classifier and Hydroseparator overflows.

A Dorr-equipped plant can produce any tonnage you need . . . can meet your specification for special sands at reasonable cost. A Dorr engineer will gladly discuss your requirements with you in terms of equipment and economics . . . at your request.



DORRCO

THE DORR COMPANY, ENGINEERS

BARRY PLACE, STAMFORD, CONN.

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CHICAGO • DENVER • LOS ANGELES

RESEARCH AND TESTING LABORATORIES

WESTPORT, CONN.

SUGAR PROCESSING

PETREE & DORR DIVISION, STAMFORD, CONN.

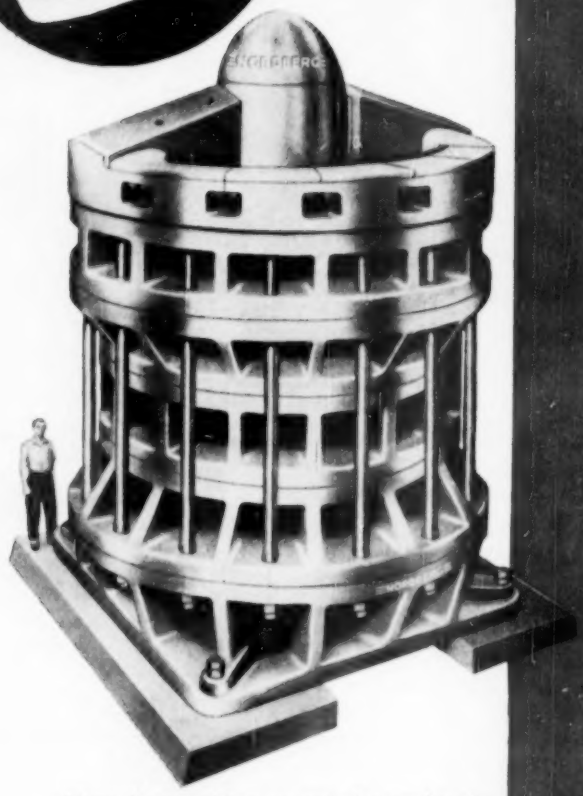
ASSOCIATES AND REPRESENTATIVES

Dorr Technical Services and Equipment Are Also Available Through Associated Companies and Representatives in the Principal Cities of the World. Names and Addresses on Request.

DORR

RESEARCH ENGINEERING EQUIPMENT

BIG



These three machines are typical examples of Nordberg engineering and development of big machinery for crushing and processing operation. This Nordberg machinery is used all over the world by efficient operators.

For complete details, write for illustrated literature.

NEW NORDBERG 54" GYRATORY CRUSHER

HERE'S the answer to your biggest primary crushing problems. This huge 54" Nordberg Gyratory Crusher is the most massive machine of its size and type ever built. Designed for extremely heavy duty service under the most severe operating conditions. Built of cast steel sectionalized main frame reinforced with large diameter tie rods. Each bearing independently pressure lubricated with temperature-controlled filtered oil.

Nordberg Gyratory Crushers are of the heavy duty type, built in sizes ranging from 30" to 72" feed openings to meet your toughest production requirements.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN
NEW YORK • SAN FRANCISCO • WASHINGTON • SPOKANE
MEXICO, D. F. • LONDON • TORONTO • JOHANNESBURG

NORDBERG


Gyratory Crushers


Jaw Crushers


Symons Cone Crushers

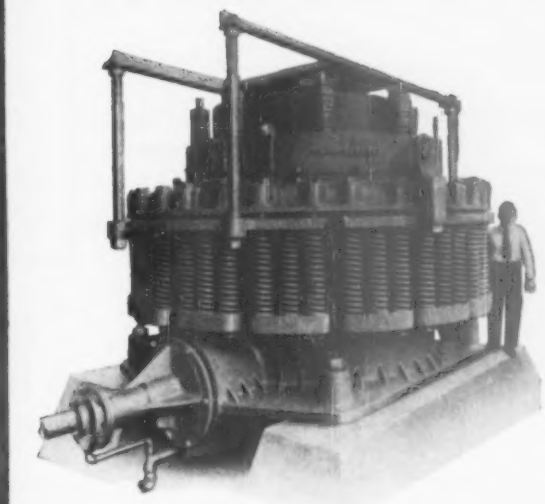

Apron and Pan Feeders


Vibrating Bar Grizzlies

FOR NON-METALLIC MINERALS

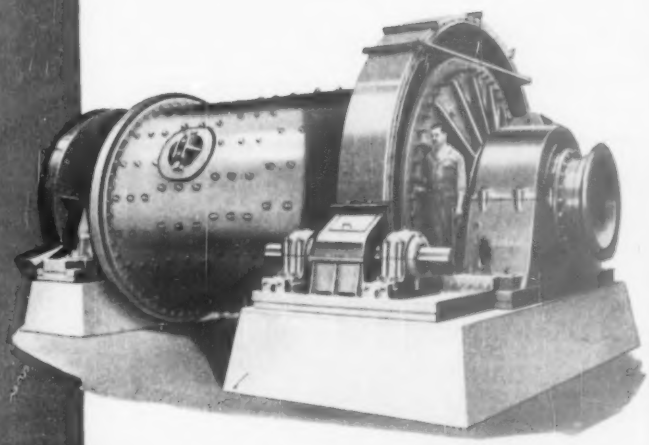
SUPERHEAVY DUTY 7' SYMONS COARSE CRUSHER

HERE is the most rugged and heaviest Symons Cone Crusher ever built. Symons Cone Crushers are known everywhere for their production of greater quantities of sized products, within closer control limits, with trouble-free lower cost operation. There is a Symons Cone Crusher best adapted to your needs for making a marketable crushed product from stone, gravel or slag. They are available in Standard, Short Head, and Intermediate types in a wide range of sizes to meet any requirement.

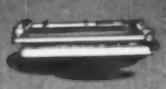


NORDBERG 10'8"x17'0" GRINDING MILL

This is the largest diameter Grinding Mill of its length ever built. This huge mill is but one of numerous Nordberg Grinding Mills for wet or dry grinding. There is a complete line of large Nordberg Grinding Mills available in ball, rod, tube, pebble and compartment types.



Machinery for processing ores and industrial minerals


Vibrating Screens


Rod Deck Screens

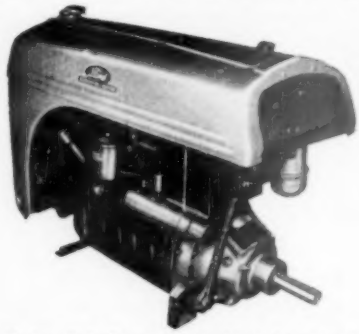

Rotary Kilns & Dryers


Grinding Mills


Diesel Engines

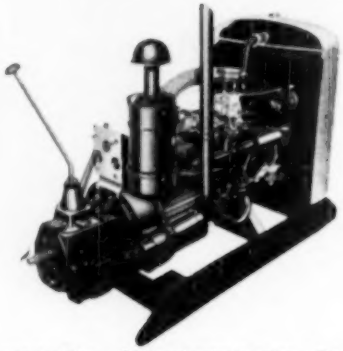
IT'S HERE...

NEW Ford "120" POWER UNIT



Removable dry cylinder liners . . . 3-ring pistons, chrome top ring . . . Moly-chrome valve seat inserts . . . Circulating cooling system with thermostat . . . Replaceable thin shell main and connecting rod bearings . . . Counterbalanced crankshaft . . . Magneto or battery ignition . . . Oil filter . . . Heavy duty oil bath air cleaner.

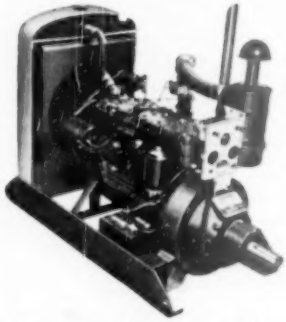
NEW Ford "226" POWER UNIT



Pad mounted oil filter . . . Full length water jacketing . . . Recirculating pressure cooling system with thermostat . . . Counterbalanced crankshaft . . . Heavy duty, replaceable thin shell copper lead bearings . . . High lift camshaft . . . Balanced carburetion (downdraft or updraft) . . . Heavy duty oil bath air cleaner.

Complete

NEW Ford "254" POWER UNIT



Pad mounted oil filter . . . Recirculating pressure cooling system with thermostat . . . Autothermic pistons with chrome top compression ring . . . High lift camshaft . . . Hard faced cobalt exhaust valve (free type valves) . . . Counterbalanced crankshaft . . . Heavy duty, replaceable thin shell copper lead bearings . . . Balanced carburetion (downdraft or updraft) . . . Air cleaner.

NEW Ford "239" POWER UNIT

Dual water pumps . . . Full length water jacketing *plus* . . . Recirculating pressure cooling system with thermostat . . . Fully counterbalanced crankshaft . . . Replaceable thin shell bearings . . . Moly-chrome valve seat inserts . . . Dual downdraft carburetion . . . Oil filter and air cleaner.

RIGHT for Centrifugal Pumps . . . Arc Welders . . . Air Compressors . . . Cranes and Hoists . . . Winches . . . Railway Cars . . . Generator Sets . . . Crane Loaders . . . Feed Grinders . . . Mechanical Shovels . . . Portable Sawmills . . . Portable Well Drillers . . . Farm Combines . . . Street Flushers . . . Concrete Mixers . . . Portable Grain Mills . . . Irrigation Equipment . . . Log Yarders and Loaders—and many other applications.

Specifications of Ford Industrial Engine Power Units

Model	Cylinders	Bore and Stroke	Displ. cu. in.	Dyn. B.H.P.	Max. Torque	Equipment Available
120	4	3⅛ x 3¼	120	38 @ 2400	92# @ 1600	Clutch, SAE #5 housing; power take-off; Ford housing; 3- or 4-speed transmission; governor. (Available as closed type power unit or engine assembly.)
226	6	3.3 x 4.4	226	80 @ 2400	182# @ 1200	Clutch, SAE #3 or #4 housing; power take-off; Ford housing; 3-, 4- or 5-speed transmission; governor. (Available as closed or open type power unit, or engine assembly.)
239	V-8	3⅛ x 3¼	239	85 @ 2400	187# @ 1600	Clutch, SAE #3 or #4 housing; power take-off; Ford housing with 3-, 4- or 5-speed transmission; governor. (Available as closed or open type power unit, or engine assembly.)
254	6	3.5 x 4.4	254	95 @ 2400	212# @ 1200	Clutch, SAE #3 or #4 housing; power take-off; Ford housing; 3-, 4- or 5-speed transmission; governor. (Available as closed or open type power unit, or engine assembly.)
337	V-8	3½ x 4⅛	337	117 @ 2400	257# @ 1600	Clutch, 5-speed direct-in-fifth transmission; overdrive transmission, direct drive power take-off. (Available as closed or open type power unit, or engine assembly.)

FORD

Industrial Engine Power Units

ARE RIGHT 3 WAYS

for your job!

1. **RIGHT POWER**—five great models in wide variety of units. Each one ready to run!
2. **RIGHT FEATURES**—all the latest advancements of Ford's famed progressive engineering.
3. **RIGHT SERVICE**—as near as your nearest Ford Dealer, clear around the world.

Line of NEW

Ford INDUSTRIAL ENGINE

POWER UNITS!

NEW Ford "337" POWER UNIT

Drop forged fully counterbalanced crankshaft, hardened journals . . . Heavy duty, replaceable thin shell copper lead bearings . . . Hard faced cobalt exhaust valves (free type valves) . . . Autothermic pistons, chrome top ring . . . Dual centrifugal water pumps . . . Full length water jackets . . . Recirculating pressure cooling system with thermostat . . . Dual downdraft carburetion . . . Oil filter and air cleaner.

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED

For Special Literature on Ford Industrial Power Units, use this coupon . . .

Industrial Engine Department

FORD MOTOR COMPANY

DEARBORN, MICHIGAN

● Ford Industrial Power Units are now available in five great models . . . four, six and V-type eight cylinder . . . 120 to 337 cu. in. displacement. *COMPLETE* with radiator . . . instrument panel and S.A.E. or Ford type housings. Foot or skid mounted. Closed and open types. Made throughout to Ford's famed hi-precision manufacturing standards. Completely tested and *READY TO RUN!*

Ford Dealers, Ford District Sales Offices and the Ford Industrial Engine Department are at your service in developing engineering recommendations showing how Ford Industrial Power Units can be most effectively applied to your job. *Mail coupon below for Ford Industrial Power Unit Folder.*

Send me comprehensive literature about the new Ford Industrial Power Units. Address: **Industrial Engine Dept., Ford Motor Co., Dearborn, Mich.**

NAME _____ *(Please print)*

STREET _____

CITY _____ STATE _____

Efficient V-Belt operation insures steady, smooth, low-cost power transmission, without maintenance worries, over long periods of time. And that's exactly the kind of economical, worry-free service BULL DOG V-BELTS deliver in all types of industry.

Each job has its own problems, however. Here are some of the common ones that engineers report in V-Belt operation, with BWH solutions:

PROBLEM	SOLUTION
Excessive Cover Wear on V-Belts	Check sheaves for worn grooves. Check alignment between sheaves. Check to see that sheaves are tight on shafts.
Covers Loosen . . Rubber Gets Soft and Sticky	Check for excessive oily conditions. If contact with oil or grease cannot be prevented, then specify BULL DOG HSO V-BELTS, which are oil resistant. (Also heat resistant and static conducting.)
V-Belts Failing Within Few Hours of Installation	This is usually caused by prying V-Belts over edge of sheaves, causing internal cords to break. Correct method of installation is to move motor of driven machine until belts do not have to be forced onto sheaves. Then move motor back until sufficient tension is applied.
New V-Belt Installed As Replacement Fails, While Old Belts Continue Running	Never install a new belt in a set of old belts, because it will be either shorter or longer than the old belts. If shorter, it will be excessively overloaded and fail. If longer, it will not transmit an equal share of the load. Always install a complete new set of belts and retain old belts for an emergency, or for temporary replacement if needed.

It will pay you to investigate BULL DOG V-BELTS on your next installation. They have what it takes for smoother operation on both FHP motors and on high-powered industrial jobs.

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems. We're specialists in solving them. Consult your nearest BWH distributor or write us direct.

BWH
DEPENDABLE RUGGEDNESS

FOR ALL MECHANICAL RUBBER GOODS CONSULT BWH

Established in 1878, BWH is today one of the world's largest manufacturers of mechanical rubber goods. Among the quality-famous BWH products which are today helping industry to do better jobs at lower cost are the following:

CONVEYOR BELTING
ELEVATOR BELTING
TRANSMISSION BELTING
AIR HOSE
CONTRACTORS' HOSE
FIRE HOSE
OIL INDUSTRY HOSE
STEAM HOSE
WATER HOSE
OIL FIELD SUPPLIES
FRICTION TAPE
SPLICING COMPOUND

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT, CAMBRIDGE, MASS., U.S.A. • P.O. BOX 1071, BOSTON, 3, MASS., U.S.A.

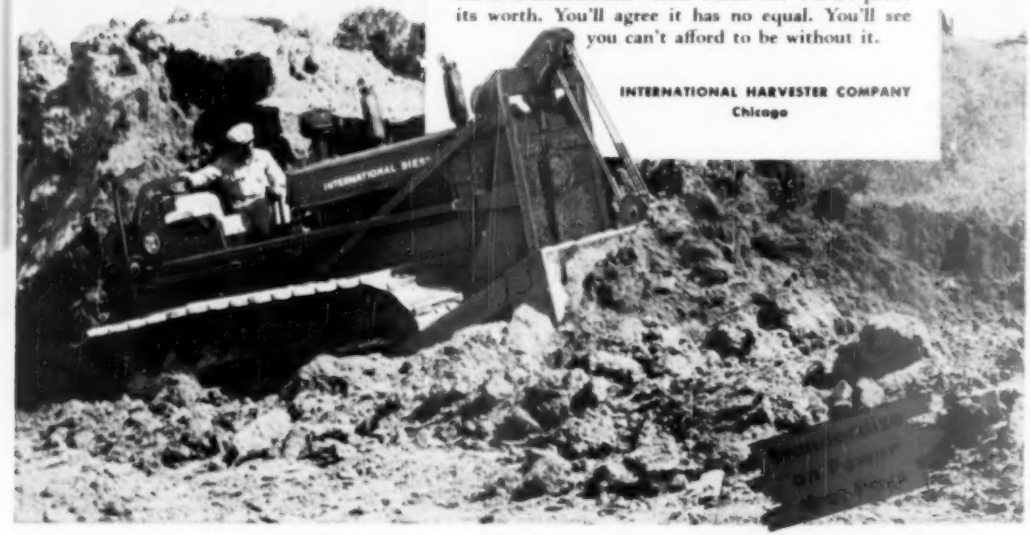
Champion OF 'EM ALL!

What makes a champion in the ring? Punching power, speed, maneuverability. A champion in the earthmoving arena needs power, speed and maneuverability too, and the International TD-24 has them all. No other crawler can match its power, its effortless ease of control, its range of eight speeds both forward and reverse. No other crawler can give you its unequaled work capacity.

The Arundel Supply Company, sand and gravel pit operator near Washington, D.C., says the TD-24 has "Proved its worth to us. It stripped over two acres in a little less than three hours' time, which is less than half the time we could have accomplished it with a dragline. More important, it did the job much cheaper."

Now is the time to see for yourself what makes the International TD-24 the "Champion of 'em All." Ask your International Industrial Power Distributor for a demonstration—then watch the TD-24 prove its worth. You'll agree it has no equal. You'll see you can't afford to be without it.

INTERNATIONAL HARVESTER COMPANY
Chicago



CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

INTERNATIONAL
INDUSTRIAL POWER

Here's ECONOMY... *in Medium Fine Grinding*

Available in a full range of sizes for capacities up to 40 tons per hour.

RAYMOND
Low Side Roller Mill

THE LOW COST PRODUCER IN THE NON-METALLICS INDUSTRY

When pulverizing materials to medium finenesses . . . all passing 10-mesh to 95% passing 100-mesh . . . the Raymond Low Side Roller Mill provides maximum economy and output, because of these advantages:—

- . . . High tonnage rate per horse-power
- . . . Low operating and maintenance costs
- . . . Pneumatic feed control to maintain peak "load" on the mill
- . . . Air separation for consistent finished products
- . . . Dustless operation
- . . . Ability to handle materials containing surface moisture with Flash Drying accessories

Its consistent performance record for half a century has made the Low Side Roller Mill the standard machine throughout the world in the non-metallics field for handling products such as limestone, phosphate rock, gypsum, marble chips, kaolin, barytes, dolomite, and similar materials.

Write for detailed information

COMBUSTION ENGINEERING—SUPERHEATER, INC.
RAYMOND PULVERIZER DIVISION
1307 North Branch Street, Chicago 22, Illinois

Western Office: San Fernando Bldg., Los Angeles 13 • Eastern Office: 200 Madison Ave., New York 16

SINCE 1887

CUMMINS DIESEL

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

Here's what you get with

Cummins Diesels

Service One of the more than 200 Cummins Dealers is as close as your phone.

Highspeed Diesel Engines (50-550 hp) for:

On-highway trucks • off-highway trucks • buses • tractors • earth-movers • shovels • cranes • industrial locomotives • air compressors • logging yarders and loaders • drilling rigs • centrifugal pumps • generator sets and power units • work boats and pleasure craft.

CUMMINS ENGINE COMPANY

LESS FUEL

A Model 710 Osgood shovel equipped with a 1¼-yard bucket and powered with a 150 hp *Cummins Diesel* uses approximately *14 gallons of Diesel fuel* in eight hours. A comparable unit powered with a *gasoline engine* working on the same job uses *45 to 50 gallons* of fuel a shift. This fuel economy report comes from Clarke Certified Concrete Company, Inc., Baltimore, Md.

LESS MAINTENANCE

Permanente Cement Company, Permanente, Calif., standardizes on Cummins Diesels because of their performance and economy. This leader in the cement industry uses 18 Cummins Diesels to power Peterbilt and Sterling tractors pulling flat bed trailers on line-haul work . . . also operates two Cummins-Powered Diesel-electric locomotives. L. M. Minich, Equipment Superintendent, says: "We're sticking to Cummins Diesels and Cummins parts and getting trouble-free transportation."

LONGER LIFE

For 15 years a 150 hp Cummins Diesel powering a six-inch Durant pump on a dredge worked eight hours a day . . . *with only two overhauls.* G. L. Anderson, owner of Anderson Gravel Company, Amite, La., says: "I wouldn't have any other power. That 15-year-old Cummins Diesel gives me such good service that when I started using a second dredge, *I bought another one just like it.*"

MORE WORK

Production of crushed stone and agricultural lime averages *1,200 to 1,500 tons an eight-hour day* in the Mulzer Brothers' quarry near Eckerty, Ind. For reasons of economy and increased production, Mulzer Brothers *standardize on Cummins Power.* A supercharged HRIS-600 Cummins Diesel powers a No. 2540 Austin-Western crusher and feeder; two LP-600 engines each power a No. 28 Gilson pulverizer; and a fourth Cummins Diesel powers a Type No. 604 Lima shovel.

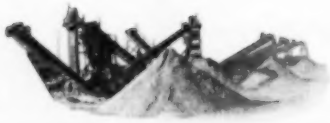
These typical examples of the profit-making power furnished by Cummins *Dependable* Diesels explain why men who pay the most attention to cost sheets and profit and loss statements choose Cummins Power. Write for further proof that Cummins Diesels can save and make *more* money for you.

Cost Conscious? **CHOOSE CUMMINS DIESELS**

INC. • COLUMBUS, INDIANA

EXPORT: CUMMINS DIESEL EXPORT CORPORATION • COLUMBUS, INDIANA, U.S.A. • CABLE: CUMDIEX

SILAS MASON bought 1,280 feet of Pioneer Conveyors for the Fort Randall Dam Project. Conveyors unload 275 tons of aggregate an hour from railroad cars and build stockpiles. A Pioneer tunnel conveyor feeds the batch plant.



MITTRY BROTHERS used the following Pioneer equipment on the big Hulah Dam Project: an Apron Feeder, Jaw Crusher, Vibrating Screens, Triple Roll Crusher, Dehydrator, Bucket Elevator, Revolving Scrubber, Storage Bins and over 1,100 feet of Conveyors.

Solve your conveyor problems for 3¢

Now, at last, with the help of a remarkable 52-page handbook, you can solve your conveyor problems as well as most experts. This handbook tells how wide, how long your conveyor belt should be. It shows correct angle of incline, spacing of idlers, motor horsepower required.

In short, this new handbook shows how to specify and order the conveyor you need . . . without a lot of technical formulas and figures.

It also illustrates the complete line of Pioneer Belt-Conveyors . . . Portable, Semi-Portable and Stationary. Send for your free copy today. Or contact your nearest Pioneer distributor. 3¢ postage on an envelope, with the coupon enclosed, may be the best investment you ever made. PIONEER ENGINEERING WORKS, 1515 Central Avenue, Minneapolis 13, Minnesota.

PORTABLE CONVEYORS become even more useful when mounted on Pioneer Hydraulic Conveyor Trucks. Easily elevate 70' conveyors in a matter of minutes. Require only 7'3" clearance. Pneumatic tires. Swivel wheels.

BUY BOTH!
Higher Output,
Lower Upkeep!

Pioneer Continuflo EQUIPMENT

Mail coupon today!

Please send me more information on the following:

- ☐ NEW HANDBOOK Pioneer Continuflo Conveyors
- ☐ BUZZER SCREENS (light duty)
- ☐ VIBRATING SCREENS
- ☐ REVOLVING SCREENS
- ☐ ROLL CRUSHERS
- ☐ JAW CRUSHERS
- ☐ APRON FEEDERS
- ☐ GRAVEL PLANTS
- ☐ ROCK PLANTS
- ☐ TRAVELING GRIZZLY FEEDERS
- ☐ MECHANICAL FEEDERS
- ☐ ORO FEEDERS (heavy duty)
- ☐ WASHING PLANTS
- ☐ BITUMINOUS PLANTS

Name _____

Company _____

Address _____

City _____ State _____

OW PRICE
ow Operating
Cost
ow Maintenance

3 NEW CEDARAPIDS

HIGH CRUSHING AND SCREENING EFFICIENCY
GOOD PRODUCTION • 100% PORTABLE

THREE new *low priced* crushing and screening plants added to the complete Cedarapids line is good news for your 1950 budget. Now you can get true Cedarapids quality for a low capital investment—the *better* value that results from Cedarapids volume production of a complete size range of aggregate producing equipment. These three new plants, specifically designed for moderate sized jobs, are quality built throughout for all the crushing and screening efficiency of the big capacity plants. Manufacturing economies resulting from simplified design and volume production are passed on to you in lower first cost. Good capacity, low operating and maintenance costs, and long service life are the economical answer to your aggregate producing problems. Write for full details, specifications and prices.

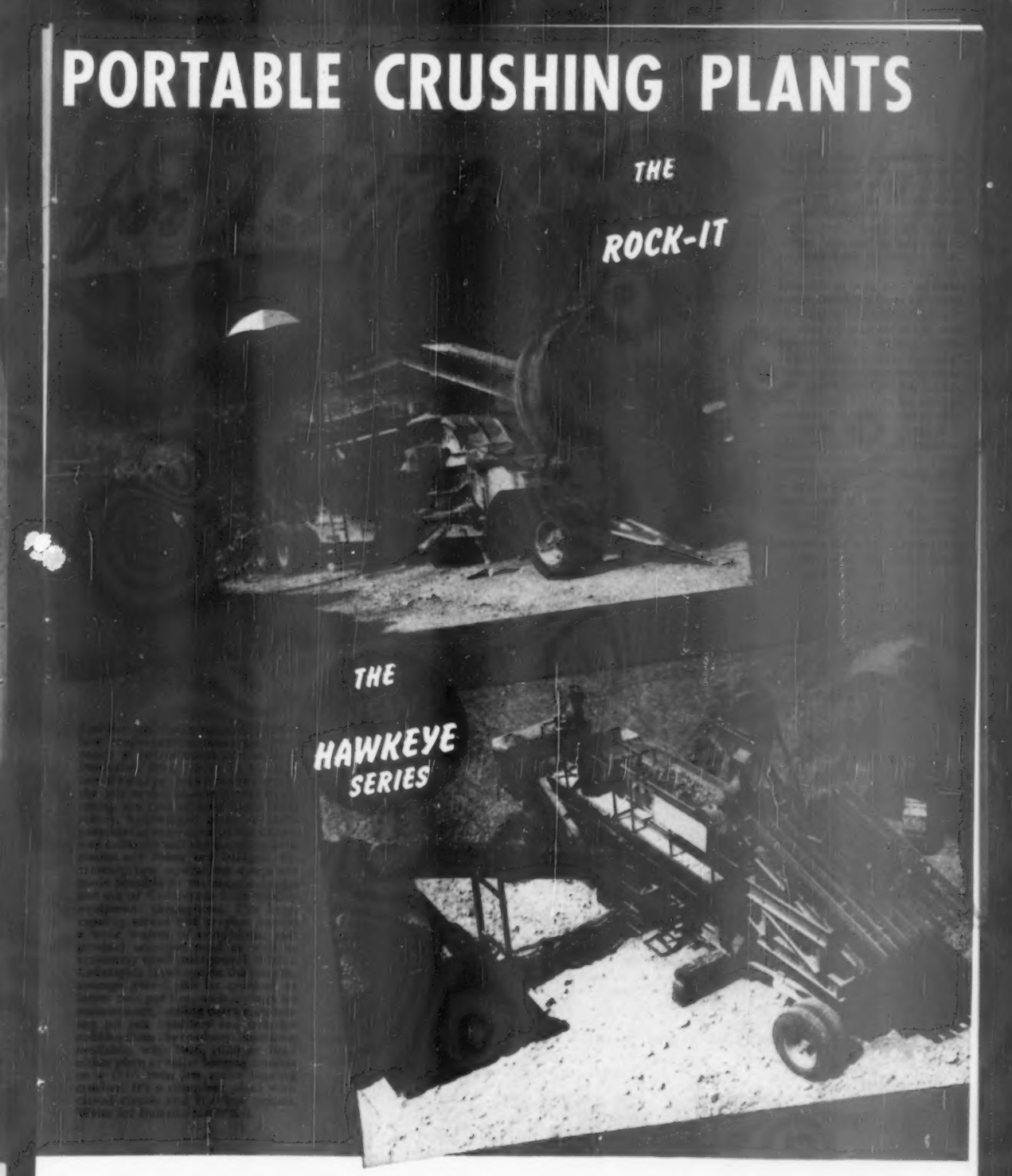
IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa, U.S.A.

Cedarapids
Built by IOWA

THE IOWA LINE *of Material Handling Equipment Includes:*

ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • BUCKET ELEVATORS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • TRAPS • PORTABLE POWER CONVEYORS • PORTABLE STONE AND GRAVEL PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • HAMMERMILLS • DRAG SCRAPER TANKS • WASHING PLANTS • SOIL COMPACTION UNITS • STEEL TRUCKS AND TRAILERS • KUBIT IMPACT BREAKERS

PORTABLE CRUSHING PLANTS



IOWA MANUFACTURING COMPANY

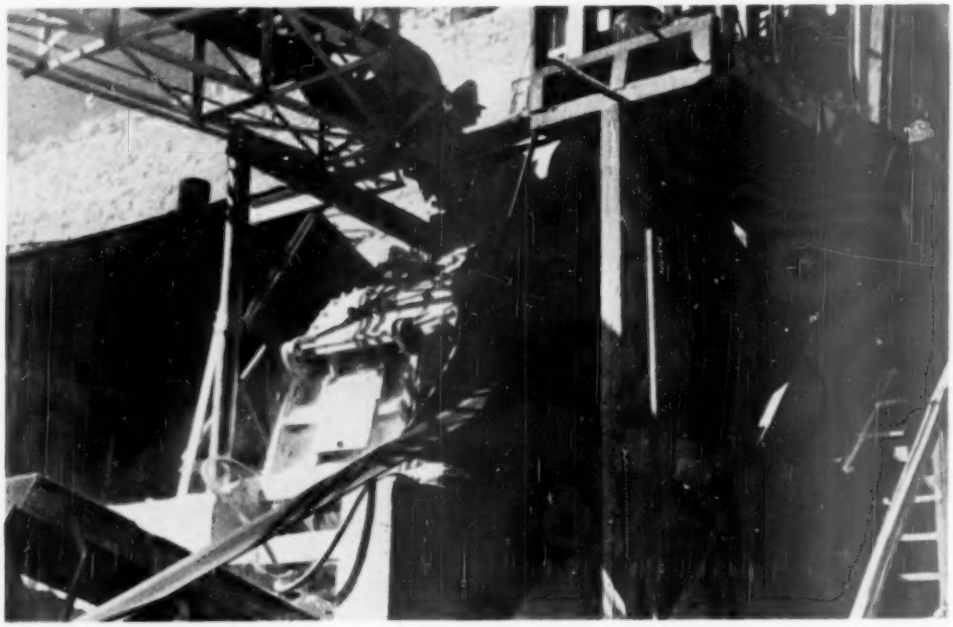
Cedar Rapids, Iowa, U.S.A.

65 YEARS OF CRUSHER ENGINEERING TO GIVE YOU EFFICIENT PLANT SERVICE

NEVADA GYPSUM ROCK

Crushed to minus 2 inches

with a GRUENDLER 6XB IMPACT CRUSHER



Location: **BLUE DIAMOND CORP., Blue Diamond, Nevada**

Before you buy your next Crusher, check with GRUENDLER.

Here are some capacity ratings of Gruendler Impact Hammer Crushers . . .

Gruendler 6XC—32x50
Ky. Limestone 200 tons per hour man size to 2 inch minus. 200 H.P.

Gruendler 6XD—32x60
Impact Center Feed 80 tons per hour crushing to 10 mesh minus. 200 H.P.

Gruendler 6XB—32x40
Impact Center Feed 125 tons per hour crushing 5 inch stone to 1 inch minus. 200 H.P.

Gruendler 4XC—20x40
80 tons per hour crushing to 1 inch minus. 180 H.P.

The Gruendler Impact Crushers have positive adjustments of product sizing

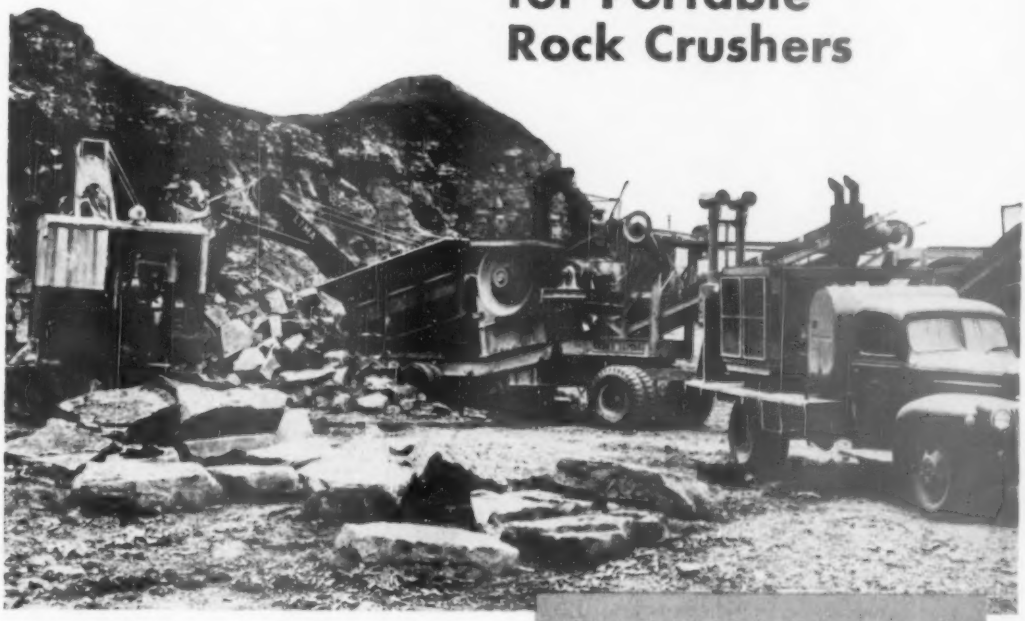
WRITE FOR BULLETIN BR 200

GRUENDLER

CRUSHER & PULVERIZER CO., ST. LOUIS, 6, MO.

Best Power there is

for Portable Rock Crushers



A truck-mounted GM Diesel Twin Six drives the 40" hammermill, a single six powers the 20" x 36" jaw crusher on this Cedar Rapids portable unit, one of two GM Diesel-powered plants operated by B. L. Anderson in eastern Iowa. Rock plant averages 130 tons of ¾" road rock per hour. Operating 18 GM Diesel engines in various pieces of equipment, Anderson has lost only one day's operation in three years due to engine failure.

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GENERAL MOTORS

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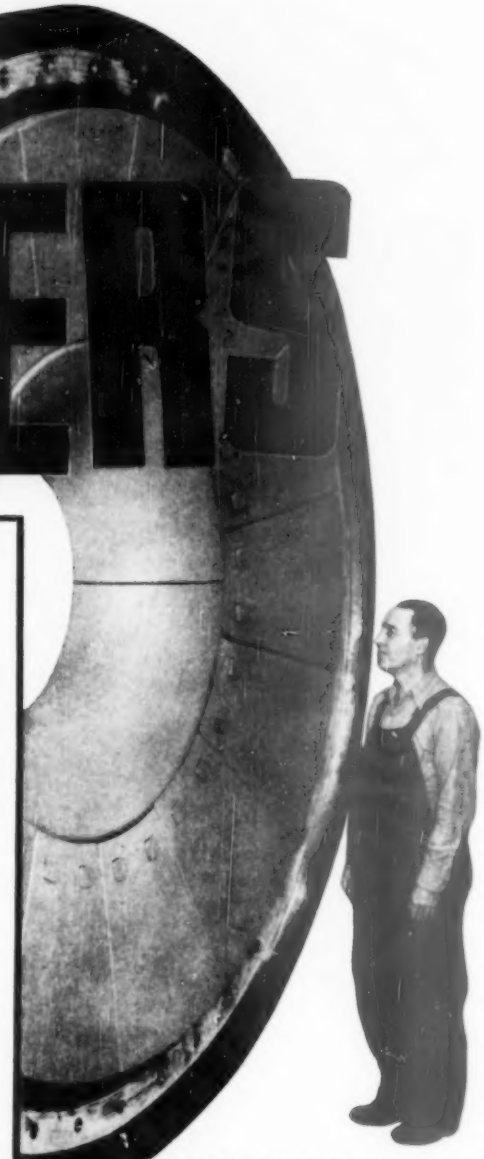
GM GENERAL MOTORS DIESEL POWER

Amsco Ball Mill LINERS



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ABK Metal (Ni-Hard)—where operating conditions involve a high degree of abrasion and very light impact.

• • •

For example, in a Colorado gold mine heat treated alloy steel liners ground 87,838 tons of ore, while Amsco 13% manganese steel liners ground 131,729 tons. At a copper mine standard manganese steel liners cost .74 cents per ton milled, while Amsco "chrome-moly" liners cost only .63 cents. All field studies prove the important point that selection of the best alloy should be controlled by the impact and abrasion conditions in the mill. For further information on this subject, send for our free 12-page booklet, "Alloy Steels for Ball Mill Liners and Grates."

Feed head for 9'6" x 32' compartment mill, showing manganese steel segmental liners and throat liners.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
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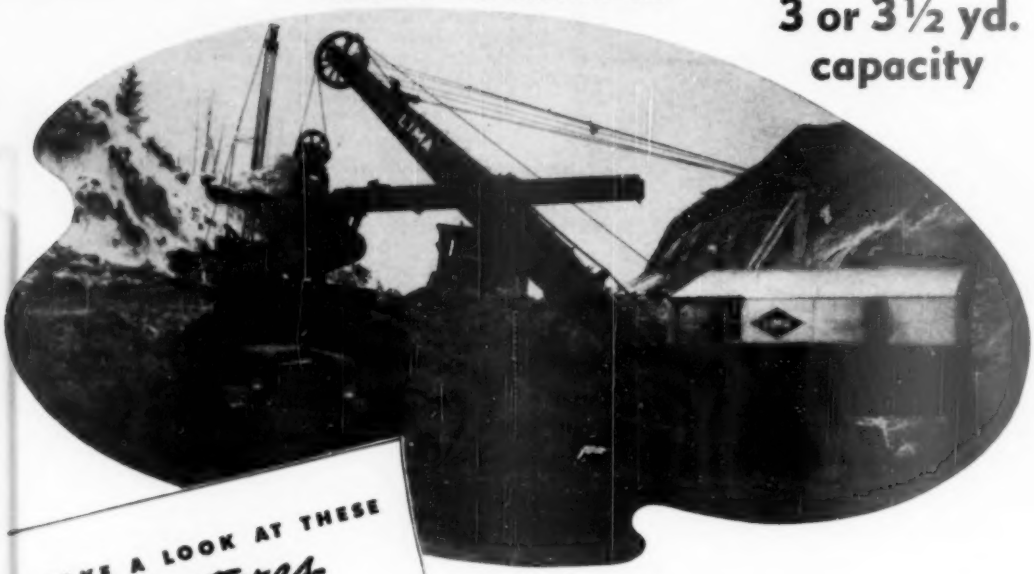

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"WE HEAR..."

January, 1950

New construction during 1950 should equal in value last year's record of more than $19,000,000,000, the Department of Commerce and the Bureau of Labor Statistics have announced. Private construction will not maintain last year's pace, but public work is expected to make up the difference. Public construction is expected to be over $6,100,000,000, an increase of nearly 18 percent over the probable expenditures of $5,200,000,000 in 1949. New industrial expansions are expected to show a drop of about 26 percent.

* * * * * * * * *

Followers of the cement industry are said to see no serious threat from the imported product as a result of the devaluation of European currencies, Wall Street Journal reports.

* * * * * * * * *

It's getting progressively tougher for engineering graduates to find a job, but it's still a lot easier than it was in the years just before the war, according to Chemical & Engineering News. An analysis of placement records of the University of Wisconsin's college of engineering shows that 81 percent of their students graduating during the past 12 months have been placed. During the war years similar surveys consistently showed 100 percent placement, but the prewar average varied between 50 to 60 percent. Apparently things are getting tougher, but employment opportunities aren't alarmingly bad.

* * * * * * * * *

Taiyo Trading Co. of Tokyo is reported to have exported 6000 tons of Japanese cement and 4000 tons of galvanized sheet iron under contract with an Argentine firm in exchange for 9000 tons of wheat as part of the government's grain import program.

* * * * * * * * *

To ease the drain on dwindling iron ore reserves and at the same time permit use of lower grade ores without the risk of lowering blast furnace efficiency, U.S. Steel Corp. will begin work soon on five new sintering plants to make powdery iron ore usable and to recover iron from blast furnace flue dust. The practice of sintering iron ore got its start in this country during the war in an attempt to utilize idle cement kilns.

* * * * * * * * *

An estimated 395 million dollars will be spent on toll road construction between now and the end of 1951, according to the American Road Builders Association. The eastern extension of the Pennsylvania Turnpike from Harrisburg to Philadelphia, a distance of 100 miles, already is under construction and is to be finished by 1951. This project was financed by sale of $87,000,000 of bonds. The western extension will cost $77,500,000 and is to be completed by the end of 1951. The New Jersey Turnpike will cost approximately $230,000,000 and is to be completed by November, 1951.

* * * * * * * * *

Under a recent court decision, an employer cannot be required to take back an employe fired for circulating a petition against a supervisor. A circuit court of appeals finds that the action of an employe, in circulating a petition seeking dismissal of a supervisor who had rebuked him for improper conduct, was not protected by the Taft-Hartley Act. The worker's plea for reinstatement was denied.

WE HEAR

Secretary of State Acheson has indicated that the United States is considering swapping 1,000,000 tons of American wheat for Indian manganese and mica because of India's desire to accumulate a stockpile of wheat.

* * * * * * * * *

In an effort to build an "inexpensive" home, a resident of the Valley City, Ohio, area, recently helped himself to some 200 concrete block belonging to Herbert Schafer. Deputy sheriffs found that the would-be mason had already started to lay up walls of a basement with the block. The guilty party admitted the theft and that he had made three trips with a trailer to transfer the block to his building site, picking them up at about midnight each time. He was ordered to return the block to their owner and pay for those he had used or broken.

* * * * * * * * *

An employer cannot safely fail to keep pay-roll records in a complete form that is readily available for inspection by representatives of the Wage-Hour Administrator. One employer was fined by a federal district court for failure to do this, after he had been ordered by the court not to violate the record-keeping provisions of the Fair Labor Standards Act.

* * * * * * * * *

Commerce on the Ohio river reached a record 42,792,487 tons in the calendar year of 1948, according to Maj. Gen. Joseph C. Mehaffey, Ohio River division engineer. Stone, sand and gravel totaled 7,985,475 tons against 7,482,585 tons the year before.

* * * * * * * * *

Congress is to be asked to increase federal aid for highway construction to almost double the current amount of $450,000,000 per year, it was decided at a recent meeting of the American Association of State Highway Officials. Congress also is to be asked to pay 75 percent instead of the current 50 percent of the cost of work on the 40,000-mile interstate network, on the grounds that these roads are essential to national defense.

* * * * * * * * *

Governmental spending by the nation's 37 largest cities amounted to $2,771,679,000 in 1948 as against $2,364,502,000 in 1947, an increase of 17.2 percent, the Census Bureau has announced. Their revenue rose 14.2 percent, to a total of $2,562,850,000 in 1948. Current operation spending of these cities was up 13.6 percent from the previous year to $1,915,402,000 in 1948.

* * * * * * * * *

The campaign against nationalization of Britain's cement industry has shown up visually right on the floor of the new house of commons. Workers, rebuilding the chamber destroyed by bombs, are using cement from bags, each marked: "Don't mix nationalization with cement." The cement industry is threatened with seizure by the state if the socialists win the next general election.

* * * * * * * * *

At Clydebank, the 34,000-ton Caronia, one of the largest passenger ships to be built since the war, is being rigged with an asbestos lining. The hull of the ship was sprayed internally with asbestos to help keep the sun's rays from penetrating below deck. The lining is to help keep out the cold also.

* * * * * * * * *

Highway construction in 1950 will advance about 15 percent to reach $1,900,000,000, according to the Department of Commerce and the Bureau of Labor Statistics. Public residential building will rise 80 percent; schools, hospitals and other public administration buildings will increase 14 percent, and sewer and water expansions also will increase.

THE EDITORS

MACHINERY FOR
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AIR DISTRIBUTORS for slurry tanks.

WASHMILL for disintegrating and mixing materials in water.

ROTARY KILNS for cement, lime, ores, etc.

UNAX KILNS, with integral cooler.

SUCTION GRATE ROTARY KILN.

ROTARY KILNS—Sintering and roasting.

PRE-HEATERS for rotary kilns.

UNAX COOLERS, cooling drums on kiln.

UNAX GRATE COOLER, air quenching.

UNAX PRE-COOLER.

F.L.S. MULTI-TUBE ROTARY COOLER.

F.L.S. INCLINED GRATE COOLER.

COOLERS, Cement Ores, etc.

CHAIN SYSTEM for wet kilns.

HEAT EXCHANGERS for dry kilns.

KILN CONTROL, electrical.

GAS ANALYZER, electrical.

KILN EQUIPMENT, fans, hoods, dampers, spouts, airseals, dust chambers, multiple gas discharge.

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EXBINER for discharging bulk cement.

EXTRACTORS, cement from silos.

SKIPULTER shaker conveyor.

CYLCUP distributing conveyor.

PNEUMATIC FEEDERS.

SLURRY FEEDERS for kilns and mills.

CRADLE FEEDERS for coal, rock, clinker.

TABLE FEEDERS for coal, rock, clinker.

COAL FEEDERS for rotary kilns.

COAL BURNERS for rotary kilns.

GAS BURNERS for rotary kilns.

OIL BURNING EQUIPMENT for kilns.

SYMETRO Drive, speed reduction units.

PUMPS for heavy liquids as cement slurry.

FLOURMETER for determining micron sizes and finely ground cement, etc.

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★ ★ ★ Editor's Page

Plant Developments and the New Competitive Era

"WE MUST hold down production costs and maintain quality while building sales in the face of heavy competition," said a producer of lime and gypsum products in answer to a letter from the editors requesting an appraisal of the outlook for business. The four points expressed in that single sentence fairly well sum up the opinions of the majority in the rock products and concrete products industries. Producers who would stay in business and earn a profit will govern their operations accordingly in 1950.

With few exceptions, the industry is finding out *again* what it means to sell its products competitively and on the basis of price and quality and service. Producers are experiencing the complications of keeping their plants operating at high production rates as a requisite to earning profits, with many more bidders than ever before as competition.

Furthermore, many now realize that their marketing areas have become so restricted because of high freight rates and other cost factors that there is less volume of business for them to seek. Only through lowered costs can the profitable shipping range be enlarged and, within restricted marketing areas, market building must depend upon creative selling.

There also are definite signs that purchasers are demanding stricter adherence to specifications and higher quality products generally; also, that more rigid specifications like those of the U. S. War Department for aggregates, as an example, are starting to influence other purchasing agencies.

These "new" complications to doing business were listed as the top handicap to be faced in 1950, with the high level of taxes, uncertainty due to distrust of the federal government and high operating costs as the principal contributing obstacles.

Cost-Cutting Ideas

In this issue of ROCK PRODUCTS there is a forecast of the outlook for business in 1950 based on our letter poll and, in review, some of the highlights in plant development of recent date are shown pictorially.

Illustrations of new plant operations and production methods are representative of steps the industry is taking to meet this revived condition of competitive bidding and selling.

Processes shown were selected as representing a second phase of modernization that is different than the rehabilitation that followed the boom after the war, when all manner of equipment was installed often purely with the sole objective of increased production.

Cost reduction and improved products are now the goals as producers seek to widen the narrow spread between normal operating costs and selling prices, in order to permit absorption of increased and still higher contemplated operating costs, and including the new item of selling expense which is being added.

New Methods

Quarry operation, which has been immune to any new radical cost-saving ideas for many years, with the notable exception of the adoption of large, economical haulage units, is one phase of production, for example, that has afforded great opportunity for improvement. Now, that fertile field for saving costs is being given much attention.

We now have the growing use of tungsten-carbide drill bits, jet piercing by oxygen-acetylene flame to burn primary blast holes, further improvement of systems for split-second delay blasting and other developments unheard of until very recently.

Similarly, we have new cost-saving ideas being incorporated throughout plant operations including highly-developed instrumentation for kiln operation, use of new metals and materials to reduce maintenance, to mention a very few, and much more efficient overall designs of plant.

From the standpoint of quality, the industry is employing more control devices like feeders, crushing practices that will produce aggregates of preferred particle shapes and has devised ingenious methods to remove elongated particles.

The foregoing are but a few isolated examples of what is taking place, that serve to give emphasis that ingenuity can and will continue to solve problems that would not have been undertaken or even considered possible without pressure.

Railroad freight rates have boomed the competition from portable plants but resourceful operators of stationary plants are beginning to turn the advantages of these plants to their own profit by buying them and utilizing them to protect and extend their marketing range. And, rather than criticize and fear the effects of specifications like those of the U. S. War Department for aggregates, some of the more aggressive producers are preparing *now* to meet specifications as rigid.

Bror Nordberg

Rocky's NOTES

Nathan C. Rockwood

Pouzzuolana, Puzzolana, Pozzolana, Etc.!

THE CEMENT AND CONCRETE COMMITTEES of the American Society for Testing Materials devoted practically a whole day at the recent San Francisco meeting to discussion of *pozzolans* and mixtures of portland cements and pozzolanic materials. Prof. Raymond E. Davis of the University of California, who was largely responsible for the symposium, said: "Among technical men in this country the preferred spelling of the word is pozzolan." We have been spelling it *puzzolan*, as that is, or was, the way the word was pronounced. The term apparently originated with the French, from the name of a town in Italy, Pozzuoli, according to modern spelling. Although the Romans were thoroughly familiar with the material and its use for making hydraulic cement for mortar and concrete as early as the first years of the Empire, Vitruvius, the engineer author of that period, does not refer to it as puzzolan or pozzolan. It was looked upon then merely as a special kind of *sand* and was used with lime in the proportion of 2 pozzolan to 1 lime. The name of the Roman town in Latin was Puzzuoli.

Vicat, the French engineer and writer on hydraulic cements in the early part of the 19th century, was perhaps the first to use the present term, which he spelled "pouzzolana" (the Latin plural). All the American text books on cement and concrete in the early years of the 20th century shortened the spelling to puzzolan, apparently following the intended pronunciation. Le Chatelier also always used the term "puzzolana." We have no quarrel with Prof. Davis if he prefers the spelling pozzolan, but we did have plenty of authority for "puzzolan," which we still believe comes nearer to the correct pronunciation.

Various Results

The various experiments and experience reported at the A.S.T.M. symposium added considerably to the already voluminous literature on pozzolans, without coming much if any nearer to explaining the chemistry or mechanics of their use in portland cement mixtures. Briefly, the substitution of a pozzolan for an equal weight of portland cement in a blend of the two does not appear to be very helpful if the concrete is dry-cured after the standard 28 days of wet curing, except in the case of the less reactive pozzolans, where the effect may be almost entirely mechanical as would be so much fine sand—that is it supplies some of the missing fractions in the fine aggregate, and has same but very little capacity to react with, or more accurately to adsorb, lime.

As one familiar with colloid phenomena would expect, the pozzolanic activity is greatest with materials like opaline silica, diatomaceous earth, volcanic ash, etc., which have large surface area, both on the exterior and in the pores and capillaries of the particles. The glassy types of pozzolans are less reactive because, regardless of how finely ground, only exterior surfaces are available for reaction.

Volume changes on wetting and drying increase when pozzolans are used, opal-containing pozzolans showing the greatest long-time shrinkage. Without air entrainment the resistance of concretes to freezing and thawing did not differ much, whether made of straight portland cement or portland-pozzolan cements. Naturally, they would not unless porosity was reduced.

The permeability of the concrete was reduced more by the opaline pozzolans in the early stages, but at later ages the glassy pozzolans were more effective, under conditions of continuous wet storage. The opaline pozzolans were more effective in preventing cement-alkali-aggregate reaction. The opaline pozzolans were also the most effective in making the concrete resistant to aggressive (sulphate) waters, and generally speaking the higher the replacement the greater the resistance.

Some pozzolans are mostly silica; all of them contain some iron oxide, alumina and alkalies. However, some good pozzolans contain as little as 40 percent silica. Hence, Prof. Davis comes to the conclusion that the chemical composition of a pozzolan does not give much of a clue to its ability to combine with calcium hydroxide, which is considered to be its most important function. Also he admits that the A.S.T.M. is a long ways from being able to write a specification for a pozzolan that will meet all conditions.

Properties Physical Rather Than Chemical

All this confusion is easy to understand when the only approach to the problem is a chemical one, based on a "solution" theory. Why we have to depend for an explanation of the cementing action of mineral particles on theories of actual chemical solution strikes us as unnecessary when we start out with the established fact as a premise that these minerals are practically *insoluble*. For example, hydrated lime or calcium hydroxide, which is one of the most soluble components of hydrated cement, actually dissolves only to the maximum extent of 1.2 grams per litre of water. Now, assuming that there are 30 gal., or about 114 litres of water in a cubic yard of wet concrete, the total amount of lime in solution at any one time is less than 137 grams, or about 4.8 oz. And, if 4.8 oz. of calcium hydroxide unites (temporarily) with 1.7 oz. of silica—their combining ratio—there is formed 6.5 oz. of tricalcium silicate. In other words, the total "silicate" thus formed in a whole cubic yard of concrete at any one time would not exceed 6.5 oz. when dehydrated.

The only way for more lime to go into "solution" is for some of that already in solution to crystallize out, or enter an insoluble combination with the other minerals present. However, investigators tell us that the lime combined with the silica, alumina and iron oxide is not immediately in crystalline form, nor do crystalline hydrates of silica, alumina and iron oxide apparently exist to any great extent in concrete, at least not in the early stages of hardening. It seems rather illogical to us to try to explain the actual cementing reaction which takes place in a matter of hours in a cubic yard of concrete as the result of the chemical formation and "crystallizing" of 6½ oz. of silicate gel, which would be about the maximum.

On the other hand, if we look for explanation in colloidal reactions, or the reactions between even larger aggregates suspended in a thickened slurry, many things, including the effects of pozzolans are possibly explainable. The fast-acting pozzolans are finely divided and composed of extremely finely porous particles. They *adsorb* the hydrated lime particles in colloidal solution or suspension in larger quantity and faster than the glassy kind of pozzolan, which have only their exterior surfaces available for adsorption. The amount and kind of pozzolan to use would therefore depend on (1) the amount of free calcium hydroxide in the wetted cement; (2) whether fast or slow reactions are most desirable; (3) whether or not the use of the pozzolan *reduces* the amount of the very small-sized pores and capillaries in the concrete.

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LABOR RELATIONS TRENDS

Union and Government Obstacles to Profit-Sharing

By NATHAN C. ROCKWOOD

APPARENTLY UNION OFFICIALS are opposed to profit-sharing by employers on general principles. It might lead to more mutually friendly attitudes, and in that case union bosses and politicians might lose influence. Anyhow, that some employers still persist in attempting to be fair and generous with employes occasionally comes to light, and we give here another example, in a suit in which the court fortunately took an understanding and sympathetic attitude toward the employer, although the U. S. Labor Department, through the Fair Labor Standards Act administrator, used all its influence, along with union labor bosses, to discourage profit-sharing in any form.

The issue raised, of course, always is whether the profit-sharing payment or bonus is or is not a part of the regular rate of pay. If it is so decided, the employer has to include such extra compensation *pro rata* in computing the overtime rate of time-and-a-half. Consequently, many small employers, who had considered their organizations as rather intimate industrial families, and thought to emphasize that relationship by profit-sharing, have been forced to abandon their practice. In most cases which have reached the courts, some one or more employes, at the urging of or under orders of union bosses, have been the plaintiffs. The case we are about to relate was brought by the F.L.S.A. administrator, McComb, in the form of an action for an injunction to restrain the employer from "violating" the law.

The case is McComb v. Neustadt et al, decided by Judge Rice in the U. S. District Court, Eastern District of Oklahoma. The employer was an oil producing organization, and involved seven employes whose claims for additional payment for overtime were supported by the F.L.S.A. administrator. The total number of employes was about 60. The principal controversy involved a consideration of whether or not the bonus system used by the defendant company until September 1, 1948, after the date of the filing of this suit, was in violation of the F.L.S.A., and whether or not the system which the defendants now employ in the payment of wages and a percentage bonus is in violation. Another contention involved the consideration of whether or not the defendants did, prior to the filing of this suit, keep and maintain proper records of the employes' time.

Profit Sharing Since 1946

The employers adopted in 1946 what was termed a "cost of living bonus system," whereby they gave their employes a bonus over and above their regular wages. The purpose of this bonus as explained by the defendant employers was to pass on to the employes a portion of the increased profits which were being realized because of the increased price for oil. The amount of the bonus varied at different times, but at the time of the filing of this suit amounted to about $95 per month for most of the employes. The defendant employers admitted that it was not considered in arriving at a regular wage rate and consequently an overtime wage rate.

In the early part of 1948, inspectors from the office of the administrator of the F.L.S.A. visited the defendants' offices and examined their books. The inspectors discussed with the employer these bonus payments. Between this time and the filing of this suit, three different inspectors appeared on the scene. They told the employers that in their opinion the system was not complying with the law in regard to figuring wage rates on overtime by not including the bonus payments in the "regular rate." The employer defendants, the judge said, had in good faith disagreed with the F.L.S.A. inspectors, contending that the bonus was a gift and no part of the wages. Finally, they invited the inspectors to suggest a system that would comply with the law. The only suggestion offered was a method whereby the bonus would be added to the regular wage and a time-and-a-half rate computed on the basis of this increased rate, which would thereby have increased the total payment to each employe.

After the filing of this suit in August, 1948, the employers changed the bonus system as of September 1, and have since continued it on the new basis. The basis is now on a percentage determined in such a way as to give each employe approximately the same wage as before, based on a 48-hour week. The total pay, including the bonus, is arrived at by first calculating each employe's pay at the regular rate, plus time-and-a-half for the overtime, and then adding a predetermined percentage, which represents the bonus. This, incidentally, is the system worked out by a Michigan employer, and upheld by the U. S. Circuit Court of Appeals, Sixth District, Cincinnati, Ohio, and described in detail in the Labor Relations Trends article in ROCK PRODUCTS, July, 1948, p. 53.

In October the employers notified their employes by letter as follows: "The flat bonus which you have previously received has been discontinued. We are now paying you a bonus of —— percent of your regular plus overtime wages. This bonus is not contractual, is not a part of your agreed salary, and is subject to discontinuance, raising or lowering at any time without notice. The bonus will be determined at the end of each month for the then calendar month." At all times the wages paid had been in excess of the statutory minimum regular rate plus overtime, and the majority of the employes had been satisfied.

Inspector Offers Nothing

At the conclusion of the F.L.S.A. inspector's court testimony, the judge invited him to express an opinion as to whether or not the revised plan of the defendants was complying with the law, but the inspector declined to express an opinion. The government's Labor Department attorneys, however, still insisted on the granting of an injunction, on the contention that the violation had continued until afer the filing of this suit. They also contended the defendants were not maintaining proper records.

This claim was based chiefly on the cases of three feminine clerks or stenographers, office employes, that the records did not reflect their working hours. However, no evidence was introduced to prove that they had actually worked more than the 40 hours per week; and as soon as the defendants learned of this shortcoming it had been corrected and records kept. As a matter of fact, the women were asked to work only 7½ hours instead of 8 hours a day. The court found these irregularities in the time records to be inadvertencies and of a minor nature; that such minor errors do not show an intent to evade or violate the provisions of the F.L.S.A., and that all of them had been and were now corrected.

The court's conclusions were: "The bonus system used by the defendants prior to September, 1948, was not in compliance with Section 7 of the F.L.S.A. The bonus system now employed by the defendants is, in my judgment, in compliance with Section 7 of the F.L.S.A. Although the bonus system employed by the defendants prior to September, 1948, was a technical violation of Section 7 of the F.L.S.A., and although there have been minor violations of the Act with regard to keeping of records, in view of the fact that past violations were either minor and unintentional or the result of errors made in good faith, the court feels that there is no need for an injunction, and that the same should be denied."

Concluding Comments

It would seem that as a matter of common sense, intelligent inspectors for the F.L.S.A. administrator could have come to the same conclusions, and have avoided a court trial, expensive both to the taxpayers and to

(Continued on page 170)

the *Personal Side* of the news

Assists P.C.A. President

G. DONALD KENNEDY, vice-president of the Automotive Safety Foundation, has been appointed consulting engineer and assistant to Frank T. Sheets,

G. Donald Kennedy

president of the Portland Cement Association, Chicago, Ill. Mr. Kennedy is a graduate in civil engineering from the University of Michigan. Prior to joining the Michigan State Highway Department in 1933, he served as city engineer and engineer of design for the city of Jackson, Mich., and director of water supply and aeronautics for the city of Pontiac, Mich. He was deputy state highway commissioner of Michigan and later state highway commissioner. He has served as president of the American Association of State Highway Officials. He also received the George S. Bartlett Award for "outstanding contribution to highway progress." He has been vice-president of the Automotive Safety Foundation since 1943.

G.S.A. President

WILLIAM W. RUBEY, staff research geologist of the U. S. Geological Survey, Washington, D. C., has been elected president of the Geological Society of America for the year 1950. Mr. Rubey received his B.S. degree from the University of Missouri in 1920, followed by additional work at Johns Hopkins and Yale Universities. After serving for a time as instructor in the geology department at Yale University, he joined the U. S. Geological Survey as associate geologist, becoming senior geologist and then staff research geologist. A member of the National Academy of Sciences, Mr. Rubey was chairman of the Division of Geology and Geography of the National Research Council from 1942 to 1946.

Elected President

LOUIS R. MYERS has been elected president of the Batesville White Lime Co., Batesville, Ark. Other officers are: Charles E. Baxter, Jr., vice-president and general manager; John Collins, vice-president; Miss Euga Wynne, secretary; and Mrs. Fred Stokes, treasurer.

Product Manager

JERRY DONOGHUE has been appointed product manager of lath and plaster for Kaiser Gypsum, Oakland, Calif. He was formerly district sales manager for Southern California, with headquarters at Long Beach, and will be succeeded in this position by RALPH MARKHAM. Mr. Donoghue, whose territory will be throughout the west, has been associated with the plastering trade since 1921. He joined Kaiser Gypsum after work at the Hungry Horse Dam, where he was associated with General Construction Co. as purchasing agent and in charge of warehousing at the job site. He became connected with the Celotex Corp. in 1938 as a plastering expert. Subsequently, he joined the staff of the old Standard Gypsum Co., Inc., which now operates under new direction as Kaiser Gypsum. Prior to that he was a member of the sales staff of Permanente Cement Co.

Jerry Donoghue

Chief Engineer

ROBERT A. TEMPLE, formerly vice-president of operations for Marblehead Lime Co., Chicago, Ill., has been appointed chief engineer of the United

Robert A. Temple

States Lime Products Corp., Los Angeles, Calif. In addition to supervising construction of the new plant at Henderson, Nev., Mr. Temple will have charge of production problems at the plants in Nevada and in California. L. N. Grindell is manager of the Nevada lime and limestone plants, and Walter A. Stinson is manager of the Sonora, Calif., plant.

Works Manager

MAX M. MULLER, formerly associated with Basic Magnesium, Inc., Henderson, Nev., has been appointed works manager of the Ohio operations of Basic Refractories, Inc., Cleveland, Ohio, with headquarters at the Maple Grove, Ohio, plant. He succeeds N. E. Hanson who was recently appointed works manager of the western division. A. M. WEANING, who has been acting works manager in Ohio, has been promoted to assistant to Tom W. Ryan, recently named manager of operations.

Editorial Director

L. A. CASTELL has been named editorial director of the Vermiculite Institute, Chicago, Ill., succeeding H. K. Lange, publicity director, who has retired from active service. Mr. Lange has been associated with the vermiculite industry since 1934, and with the Vermiculite Institute since 1945. He directed the preparation of many articles dealing with the uses of vermiculite in construction and other fields, and is well known in the building materials industry.

Manages Gypsum Operations

JOHN V. POOLER, superintendent of the Long Beach, Calif., plant of Kaiser Gypsum, Oakland, Calif., has been appointed manager of operations of all

Ernie Shaper

plants and quarries, including Long Beach, Redwood City and San Marcos Island, Baja, Calif. In addition, he will supervise shipping and construction activities of the company. JOHN O. LEWIS, formerly superintendent at the Redwood City plant, has been named superintendent at Long Beach, and ERNIE SHAPER, plant engineer at Long Beach, has been appointed superintendent at Redwood City.

Mr. Pooler has had 15 years' experience in the gypsum industry, starting in as a research laboratory helper. He was board plant superintendent for Kaiser Gypsum before becoming plant superintendent. He received his education in the mechanical engineering field at Armour Institute of Technology, Chicago, and the University of Illinois.

John O. Lewis

Mr. Lewis, who has been with the Kaiser organization since 1947, has spent 23 years in the business of making gypsum board. He was with the Celotex Corp. in Texas for five years as board plant superintendent and works manager. Prior to that he was board plant superintendent for Certain-teed Products Corp. of Texas.

Mr. Shaper has been with the Kaiser interests since 1938. He was employed as an engineer at Grand Coulee Dam, worked at the Kaiser Shipyard No. 2 in Richmond, and the steel plant at Fontana. He joined Kaiser

John V. Pooler

Gypsum in 1946, and helped in the construction of the plant. He is a graduate of the University of Missouri with a B.S. degree in engineering.

Attend London Conference

REPRESENTATIVES from the United States who attended the three-nation technical conference in London, England, recently, to discuss problems of locating, mining and processing radioactive ores, included Dr. A. M. Gaudin, professor of metallurgy and director of the metallurgical laboratory of Massachusetts Institute of Technology, Cambridge, Mass.; Dr. W. Hirshkind, director of research, Great Western Division, Dow Chemical Co., Pittsburg, Calif.; Dr. Thomas B. Nolan, assistant director, U. S. Geological Survey, Washington, D. C.; and Dr. John C. Rabbitt, chief of mineralogical laboratories, Petrography and Geochemistry Branch, U. S. Geological Survey, Washington, D. C. The United States, the United Kingdom and Canada were represented at the meeting, which is the third of a series of similar conferences held in Washington in 1947 and in Ottawa last year.

Regional Director

J. BRUCE CLEMMER, mineral technologist and administrator with the Bureau of Mines for over 20 years, has been appointed regional director of Region VII of the Bureau, with headquarters at Tuscaloosa, Ala., which includes the States of Tennessee, North and South Carolina, Georgia, Alabama, Mississippi and Florida. He was formerly chief of the Tucson, Ariz., branch of the former Metallurgical Division. Graduated from the South Dakota State School of Mines at Rapid City, S. D., in 1927, Mr. Clemmer joined the Bureau at Rolla, Mo., in 1928, after completing work for his Master of Science degree at the Missouri School of Mines at Rolla. He is an outstanding authority on froth flotation for concentrating and separating both metallic and nonmetallic ores, and developed a method for concentrating manganese ores and one for treating a Vermont talc ore so that a satisfactory talc and a nickel concentrate were produced.

Mr. Clemmer also has devoted considerable effort to the concentration of fluorspar, from which has resulted the establishment of a fluorspar mill at Cave-in-Rock, Ill. While at Tuscaloosa in 1939-45, he developed a method of separating fluorspar and barite, continuing this work after going to Tucson. As chief of the metallurgical branch at Tucson, he had charge of the Bureau's studies of perlite. He is a member of the Minerals Beneficiation Division, A.I.M.E., and a member of the research committee of the Perlite Standards Association.

European Traveler

JOHN L. STRANDBERG, president and treasurer of the Concrete Building Units Co., Kansas City, Mo., accompanied by Mrs. Strandberg, made a four months trip to Europe recently, visiting nine countries and covering 15,000 miles in their own automobile. It was the second trip in two years for Mr. Strandberg, who was born in Lulea, Sweden, where his father still resides, and the first time Mrs. Strandberg had been away from this country. We thought the following report of Mr. Strandberg's trip and his observations would be of interest to our readers:

The European landing was made at Gothenburg, Sweden, then by automobile to Oslo, Norway, and then 150 miles north of the Arctic Circle as far as highways were built into the Lapland country, with a stop at Kiruna, Sweden, one of the most northerly cities in the world. Describing construction materials in use in that far off land, Mr. Strandberg said almost 90 percent is masonry construction. He was astonished at the number of concrete block being used. The Laplanders have been a nomadic people for generations, but seem to be tending toward a more permanent

manner of life. Women and children were camera shy, but he managed to get some good shots.

The trip continued along the east coast of Sweden with a crossing to Denmark and then by automobile to the larger cities in American occupied Germany, Holland, Belgium, Luxembourg, Switzerland and France.

His observations of socialistic types of European governments are that the people are living in Marshall Plan glass houses from which a rude awakening will follow when funds cease. Sweden, which is the elder statesman among the socialized groups, appears to be breaking away and the last popular election in 1948 replaced considerably the number of Socialists in their governing bodies with Conservatives. American activities are constantly in the limelight by reason of radio and newspaper broadcasting. Ninety percent of the people in the socialistic countries he visited oppose Communism and hold it in great fear. War devastated areas in Germany and France appeared to be very slow in clearing up rubble and debris of the thousands of destroyed buildings. Highways and streets have been made usable. A comparatively small number of destroyed bridges have been replaced with structures of the type utilized in military operations, and some damaged bridges are now in course of reconstruction. There are few, if any, signs of poverty and the country looks prosperous, but Mr. Strandberg thinks it is an artificial condition that would change quickly if American money were withdrawn.

One of the principal business objectives of the trip was to make further study and investigation of the cellular building material known as Y-tong, which has taken the construction industry by storm, and as a masonry product has to a large extent replaced other materials, except for underground use where the concrete block continue in wide use for foundations. The product is manufactured at Yxhult, Sweden, in the central part of the country about 20 miles from the city of Orebro. Shipped in block form by rail, truck and water, the equivalent of 25 million 8 x 8 x 16 units are being sold each year at approximately 25c per unit, in American money, f.o.b. plant. Distribution extends over a 1000-mile area including Norway, Denmark, Poland and Finland. Concrete block are slightly cheaper in cost. Y-tong units are laid up in mortar and have gained favor by reason of their high crushing strength of from 700 to 1500 p.s.i.; high insulation value, almost equalling cork; of being devoid of either expansion or contraction; impervious to fire and water; and light in weight and yielding easily to boring or cutting with an ordinary hand saw.

The manufacturing process, which involves an outlay of 4½ million dollars for plant development and work-

John L. Strandberg

ing capital, requires, first of all, an abundant supply of limestone and oil shale. A stockpile of one-half limestone and one-half shale of around 25,000 cu. yd. is accumulated and fired from the bottom. The oil shale provides fuel and the mass is allowed to burn into a clinker over a period of two or three months.

The clinker is then run through crushers and ball mills and screened through a 100-mesh sieve. It then goes into a mixer where water and alumina powder are added. The soupy mixture is then transferred to open vats, 3 ft. x 5 ft. x 20 in. high, which move along a rail track. The vats are filled to only two-thirds capacity, as the mixture expands and it is necessary after 15 min. to remove a 2-in. layer from the top of the vat which is returned to the mixer. The vats are moved forward and when the mixture has hardened sufficiently, the sidewalls of the vats are collapsed and overhead saws are used to cut the block into desired sizes. A traveling crane picks them up and deposits them in high pressure steam kilns for curing. The block are again handled by small crane and loaded into trucks or freight cars.

Mr. Strandberg's interest in concrete products has been on a national scale since 1942, when he was active in the reorganization of the National Concrete Masonry Association on a self-sustaining basis, and served then as its president. By virtue of being a past president, he is a life-time advisory director of the Association. In the past seven years, the membership has grown to 1000 members.

Public Works Commissioner

ALBERT J. FABER, owner of the Faber Cement Block Co., Paramus, N. J., is also commissioner of public works of Ridgewood, N. J.

OBITUARIES

JULIUS P. HEIL, founder and chairman of the board of The Heil Co., Milwaukee, Wis., died suddenly on November 30 while pheasant hunting in southern Wisconsin. He was 73 years old. Mr. Heil was active in many social, civic and philanthropic organizations. While serving as Governor of Wisconsin, his famous slogan, "Wisconsin—America's Dairyland," helped to gain recognition for the dairy products of his State.

SIDNEY J. ROBISON, who was chief engineer of the Universal Atlas Cement Co., New York, N. Y., at the time of his retirement in 1944, passed away on December 3. He was 70 years old and had been ill only about six weeks. Born in Montezuma, Iowa, Mr. Robison graduated from Grinnell College in 1900 and attended Armour Institute of Technology in Chicago from 1901 to 1903. He first worked for Universal Atlas at the Buffington plant as a drafting room checker during 1909-1910 and as assistant mechanical engineer during 1911-1912. He rejoined the company as engineer at the Chicago office in 1919, and three months later was promoted to assistant chief engineer. He was appointed chief engineer in 1937, which position he held until his retirement in 1944. Following his retirement and until the time of his death, Mr. Robison was a sales engineer in the Chicago office of Western Precipitation Co.

GLENN B. HEFFELFINGER, assistant chief engineer in charge of large shovel design for Marion Power Shovel Co., Marion, Ohio, died suddenly on November 13. He was 60 years of age and had been associated with the company for more than 25 years.

J. E. Dodson, vice-president of the Miami Crushed Stone Co., Miami, Fla., died recently in Coral Gables, Fla., where he resided. He was 52 years old. Mr. Dodson was also general manager of the Oolite Rock Co.; president of the Material Sales Corp.; secretary-treasurer of the Peninsular Materials Corp.; and a director of the Belcher Oil Co.

C. L. CHAPPELL, plant superintendent of the R. E. Janes Gravel Co., Austin, Texas, since 1929, was one of 28 persons killed in the Dallas crash of an American Airlines plane on November 29. He had boarded the plane at Philadelphia on his way back to Austin from a business trip north.

CLARENCE B. HOOVER, superintendent of the Columbus, Ohio, division of water and an authority on municipal water supply, died November 5. He was 68 years old. A graduate of Ohio State University, Mr. Hoover was author of the National Lime Association book on Water Treatment.

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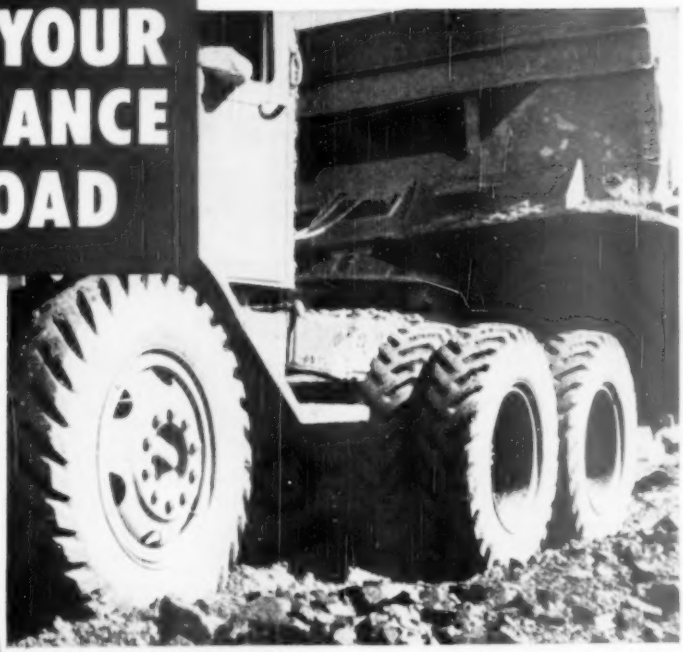

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INDUSTRY News

Huron Cement to Expand Facilities

HURON PORTLAND CEMENT CO., with offices in Detroit and a producing mill at Alpena, Mich., has announced a new building program that will expand further the company's production and shipping facilities. Emory M. Ford, president, states that the first phase of Huron's post-war construction project, begun in 1946 and completed in 1949, covered the installation of four new kilns with the attendant enlargement of all the equipment required for the greatly increased flow of materials from raw to finished state. This program made the Alpena installation the world's largest single cement producing mill, according to Mr. Ford. Included in this expansion was the addition of another steamer to the fleet of the Huron Transportation Co., a subsidiary, bringing the number of self-unloading bulk carriers to three. These three ships, the S. T. Crapo, John W. Boardman, and Samuel Mitchell, serve the company's ten distributing plants located at Saginaw, Detroit and Muskegon, Mich.; Cleveland and Toledo, Ohio; Milwaukee and Green Bay, Wis.; Buffalo and Oswego, N. Y.; and Duluth, Minn.

The year 1950 will see the second phase in the company's expansion involving the addition of two new kilns at Alpena with the necessary waste-heat boilers, coolers, dust precipitators, coal mills, and other equipment, and the erection of a new plant at Superior, Wis. The Superior plant will mark a departure from Huron's customary distribution practice wherein finished cement is carried by vessel from Alpena to the bulk storages of the auxiliary plants. In this case, cement clinker will be carried from Alpena in standard bulk freighters for finishing at the Superior mill. This mill will consist of the required facilities for storing and handling cement clinker, together with a grinding plant, storage silos for finished cement, and packing and loading equipment. It is expected that all of these new facilities will be in production in the third quarter of 1950.

Currently under way as additional elements in Huron's enlargement are a modern distributing plant at Green Bay, Wis., and additional storage silos at Muskegon, Mich. The Green Bay plant will replace portable storing and packing facilities which have been in use there for about 10 years. The harbor, dock and building foundations for this plant were completed last year. Foundation piling for the new Muskegon silos is now being driven.

Mr. Ford has listed several other pieces of new construction that have been authorized by the company directors. These items include installation of radar sets on the three ships; revision of the raw material handling machinery at Alpena; four new electric precipitator installations at Alpena; increase in boat loading capacity; and installation of Fuller Airslides in the boat unloading systems at Milwaukee, Toledo, Saginaw, Duluth and Oswego.

Million Dollar Plant for Potash Firm

THE POTASH CO. OF AMERICA will build a new million dollar plant near Carlsbad, N. Mex., the company's president, G. F. Coope, announced recently. Company directors authorized the new structure for the production of potassium sulfate and hydrochloric acid, Mr. Coope said.

The company recently completed a $4,000,000 plant expansion program to increase the output of 60 percent muriate, its major product. Work is expected to begin on the new plant in the near future.

Fly Ash Sold by Power Company

COMMONWEALTH EDISON CO., Chicago, Ill., has disclosed that half of its 1950 output of fly ash will be sold at a profit. The utility company for years has been endeavoring to promote the sale of fly ash to be mixed with cement for making concrete. Edison's total production of this material next year will be about 150,000 tons. Only a small proportion was sold formerly.

Most of this output will be used in the construction of Hungry Horse Dam on the Flathead River in western Montana. Engineers of the U. S. Bureau of Reclamation have specified the use of this material in building the dam. The project will take 50,000 tons of the fly ash annually for three years. It is estimated that this will cut cement costs by a million dollars, give the dam a longer life, and largely reduce the heat generation which normally plagues builders of massive concrete structures.

Edison engineers said that the utility, which is regarded as one of the prime movers in development of the concrete market for fly ash, will be the only supplier of the Montana project. The material will have a delivered price of $12 a ton, of which $11 is freight expense.

American Aggregates Corp., Indianapolis, Ind., has repowered the Model 50B Bucyrus-Erie dragline shown with a Model NHIS-600 Cummins diesel. The dragline is equipped with a 65-ft. boom and 2-cu. yd. bucket, and handles from 1200 to 1500 tons of aggregate per 8-hr. day

Granted Patent on Cement Composition

FRED M. ERNSBERGER, DONALD R. MACPHERSON AND WESLEY G. FRANCE have been granted a patent on a "Cement Composition and Indurating Mixture Therefore" which has been assigned to the Master Builders Co., Cleveland, Ohio. As is generally known, the properties of cement compositions, such as concrete, are influenced by amount of water employed in the mix. Strength and density of the finished material are adversely affected by an increase in water content. Various additive agents for reducing the ratio of water to cement have been suggested before but, according to Messrs. Ernsberger, MacPherson and France, they have involved disadvantages, i.e., lowering the strength of concrete or mortar either during its early ages, below that of a plain mix, or at later ages.

It is the object of their composition to overcome these limitations. For this purpose they have discovered that addition of certain derivatives of a waste sulphite liquor in an amount ranging from approximately .01 percent to .6 percent of the weight of cement, results in a concrete or mortar mix having an improved compressive strength at early as well as late ages. The new agent is said not only to accelerate hardening of concrete, but to permit a reduction in the proportion of water to cement. In addition, it is not harmful if inadvertently used in larger amounts than usually recommended.

Form Lightweight Aggregate Company

CAROLINA TUF-LITE CO., Salisbury, N. C., has been formed by A. S. Johnson, Allen Johnson and E. A. Goodman. Preparations are underway to erect a $150,000 plant to produce Tuf-Lite, a lightweight aggregate made from expanded clays and shales by a sintering process. The plant will be located on a 142 acre site near Salisbury on the main line of the Southern railway.

Installs New Pebble Mill

APPALACHIAN MINERALS CO., Monticello, Ga., is installing an 8- x 60-ft. Hardinge pebble mill with superfine classifier, according to current reports. This will enable the company to manufacture fine grades of feldspar flour for the ceramics industry and other markets. ROCK PRODUCTS published a complete description of this new operation in the October, 1949, issue (pp. 94-96).

Clarification

IN THE OCTOBER, 1949, issue of ROCK PRODUCTS, page 81, the machine referred to as a "jitterbug," a nickname for the unit, is a concrete pipe off-bearing cart, manufactured by Ivy H. Smith Co., Jacksonville, Fla. According to the firm, the machine is the only one of its kind to successfully off-bear concrete pipe in any size up to 60 in. It will take pipe and forms from the machine through the curing room, strip the forms and remove them from the pipe. The device is covered with "patents pending."

County Gravel Plant

A NEW GRAVEL PLANT has been placed in operation by the Marysville, Kan., county on the Little Blue river, according to county engineer C. T. Mohrbacher. No new equipment was purchased for the plant, which is producing river-run gravel for county roads at the rate of 100 cu. yd. a day.

Cement Competition

PERMANENTE CEMENT CO., Oakland, Calif., has charged that the Superior Portland Cement Co. is waging a bitter but losing fight with the declared purpose of preventing Permanente from doing business in the state of Washington. H. J. Kaiser, president of Permanente, in making his allegations, has stated that for 15½ years Superior held virtual control of the cement market in the northwestern Washington area by means of leasing the Pacific Coast Cement Co.'s Diamond plant in Seattle, but that Permanente broke this stranglehold by erecting facilities in Seattle in 1946 and also by taking an assignment of a lease of the Diamond Cement plant.

Coming Conventions

January 17-19, 1950—

National Agricultural Limestone Association, 5th Annual Convention, Hotel Statler, Washington, D. C.

January 19-20, 1950—

Wisconsin Concrete Products Association, 30th annual convention, Plankinton Hotel, Milwaukee, Wis.

Week of January 22, 1950—

National Sand and Gravel Association, 34th Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

Week of January 22, 1950—

National Ready Mixed Concrete Association, 20th Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

Week of January 29, 1950—

National Crushed Stone Association, 33rd Annual Convention and Exhibit, Stevens Hotel, Chicago, Ill.

February 1-3, 1950

Agricultural Limestone Institute, 5th Annual Convention, Stevens Hotel, Chicago, Ill.

February 6-9, 1950—

National Concrete Masonry Association, Annual Meeting, Sherman Hotel, Chicago, Ill.

February 20-22, 1950—

American Concrete Institute, 46th Annual Convention, Edgewater Beach Hotel, Chicago, Ill.

February 22-25, 1950—

American Concrete Pipe Association, 42nd Annual Convention, Fairmont Hotel, San Francisco, Calif.

February 27-March 3, 1950—

A. S. T. M. Committee Week and Spring Meeting, Hotel William Penn, Pittsburgh, Penn.

March 2-4, 1950—

Autoclave Building Products Association, Annual Convention, Hotel Statler, Washington, D. C.

March 6-9, 1950—

American Road Builders' Association, 47th Annual Meeting, Cincinnati, Ohio.

File Dust Complaint Against Cement Company

CALIFORNIA PORTLAND CEMENT CO., Colton, Calif., has been named in a $472,000 suit against the company for alleged damage to an 8700-tree orange grove about a mile from the manufacturing plant. The complaint states that the smoke, fumes and cement and plaster dust have "stunted and weakened" the trees and made them "valueless" by incrusting the foliage and buds. It is claimed that each of the trees has been damaged to the extent of $30 over a period of three years by the air pollution.

An attorney for the orange grove owners says that research has shown that trees that have been washed clean of the cement dust produce normally, but that others have lost 90,000 boxes of oranges in decreased production over the three-year period. The suit asks $251,000 for tree damage; $25,000 for increased costs and expenses in operating the grove, $5000 for injury and deterioration of dwellings, and $1000 for increased expenses for upkeep on motors and mechanical equipment.

Products Company Takes Employes on Tour

MORE THAN 60 employes of Otto Buehner and Co., Salt Lake City, Utah, were taken on a tour recently through various buildings now being constructed in the state with the company's cast stone products. The purpose of the tour was to show workmen from each of the departments how their specific crafts relate to the finished job and how the quality of their work affects the appearance of the building. The tour group was divided into smaller units, each with a guide, so that each department could study in detail the work for which it is responsible. Through these periodic tours, Otto Buehner & Co. hopes to give each of its employes a better picture of how careful workmanship shows to good advantage on the job.

Seeks Additional Land

COLUMBIA QUARRY CO., St. Louis, Mo., is negotiating with the Kato-Ballard-Nalley Co., operator of the Ullin quarries at Ullin, Ill., for the purchase of the present operators' lease, it has been announced by W. E. Schmidt, vice-president and treasurer of Columbia. The Kato-Ballard-Nalley Co. has a rock rights lease for 150 acres at the quarry. The Ullin rock is a high calcium limestone.

Home Builders Convention

THE 1950 CONVENTION and Exposition of the National Association of Home Builders will be held in Chicago, February 19-23. According to Paul S. Van Auken, convention-exposition director, the exposition will be the largest and most diversified display of home building materials and equipment presented to date. By housing exhibits in both the Stevens and Congress hotels, exhibit space has been increased 25 percent over the 1949 show.

N.C.S.A. Safety Competition

NORTH AMERICAN CEMENT CORP., Hagerstown, Md., through operating its Hagerstown limestone quarry a total of 174,269 man-hours in 1948 without a single lost-time disabling injury won the top safety award of the National Crushed Stone Association. In this company's 19 years of participation in the contest, this is the first time it has won a trophy, but previously it has been awarded Certificates of Honorable Mention for accident-free operation. The competition is conducted by the Bureau of Mines, with a bronze plaque being awarded to the winner by *Explosives Engineer*. It is notable that the Hagerstown quarry in its 19 years of participation in the competition attained a record of slightly more than 2 million hours with a severity rate of 0.46 days lost per 1000 man-hours and a frequency rate of 8.40 injuries per 1,000,000 man-hours.

Vermiculite Sales Increase

A. T. KEARNEY, president of the Zonolite Co., Chicago, Ill., world's largest producer of vermiculite, revealed at a recent sales meeting that vermiculite plaster aggregate makes up more than 20 percent of the nation's plaster aggregate sales. The last decade has seen an increase in his company's sales of more than 1100 percent, Mr. Kearney said, and production for the past 12 months at the Zonolite mines in Libby, Mont., and Tigerville, S. C. has resulted in 36,000,000 cu. ft. of expanded vermiculite.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 19,057,000 bbl. of finished cement in October, 1949, as reported to the Bureau of Mines. This was a decrease of 2 percent compared with the output in October, 1948. Mill shipments totaled 21,277,000 bbl., an increase of 5 percent over the October, 1948 figures, while stocks of 8,577,000 bbl. were 41 percent above the October, 1948 total. Clinker production in October, 1949 amounted to 18,249,000 bbl., a decrease of 6 percent compared with the October, 1948 total.

Erect Perlite Plant

A CRUSHING AND GRADING PLANT for perlite will be erected at Lovelock, Nev., by Henry Schwabrow, Marion Schendel and Everett Chapman, who are operating the Pearl group of perlite claims in the area.

Safety Trophy Winners

WINNERS in the annual safety contest conducted jointly by the U. S. Bureau of Mines and the National Sand and Gravel Association for the calendar year 1948 are: Dolen plant, Texas Construction Materials Co., Romayor, Tex.; and Fair Oaks plant, Pacific Coast Aggregates, Inc., San Francisco, Calif. The former group competed in the group working 100,000 or more man-hours in the year and the latter in the group working less than 100,000 man-hours.

These two companies will receive cast stone plaques awarded to winners of this contest each year by ROCK PRODUCTS. This year the presentation will be made at the N.S.G.A. convention to be held in Chicago in January.

The 1948 contest saw 103 sand and gravel plants competing, the largest in the 20-year history of the event. Total reports showed 172 disabling injuries at these plants during a total of 5,857,039 man-hours of work. The injury severity rate of 2.244 days lost per 1000 man-hours of work was an improvement over the preceding year. Employes and officials at 46 of the competing plants worked the entire year without any lost-time accidents. Two of the 46 plants were former trophy winners.

In a recent executive letter from the National Sand and Gravel Association, it is stated that the method of determining the winner in each year's contest has been modified to include only members of the Association.

Increases Cement Plant Capacity

TRINITY PORTLAND CEMENT CO., Dallas, Texas, will increase the capacity of its home plant by 1,250,000 bbl. of cement per year, James F. Hayden, vice-president, has announced. Purchase of a large new kiln, grinding machinery and other equipment for the Dallas plant has been authorized by directors of General Portland Cement Co., of which Trinity is a division. Orders for the new equipment will be placed immediately, according to Mr. Hayden.

Wire Rope Standards

NATIONAL BUREAU OF STANDARDS has announced a proposed revision of Simplified Practice Recommendation R198-43, Wire Rope, to be sent to all interests for comment. General adherence to the 21 tables in the recommendation will result in reducing the variety of stock items from 987 to 657, or 33 percent. Wirerope itself, covered by 4 different rope constructions, would be reduced from 352 stock items to 182, or a reduction of 48 percent. Wire rope users may write to the Commodity Standards Division, National Bureau of Standards, Washington 25, D. C. for full information.

HINTS and HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Hot Cinder Haulage Bodies

GENERAL SHALE PRODUCTS CO., Kingsport, Tenn., uses cinder aggregate for lightweight block production. Cinders are secured locally and are

Specially-built dump-truck body used to haul hot cinders. Clam-shell left, of 3-cu. yd. capacity, transfers material to crusher

hauled to the plant for processing in a company truck equipped with a special dump body required because of the high temperature of the cinders.

The bodies were built by the company and are extremely rugged. Clinker as well as rejected block are dumped to ground storage from an elevated structure. A 3-cu. yd. Wiley stiff-leg crane delivers the material to an American (No. 482) grinder that has a solid bottom and two 3-ton mullers. The grinder operates in closed circuit with a 3- x 10-ft. New Holland vibrating screen.

This company is among the first to use the new Spectra-Glaze process developed by Burns & Russel Co., Baltimore, Md. In this process cinder block are treated with a plastic solution that gives the finished unit a smooth surface. A wide variety of colors is obtainable.

Lightweight Pipe Supplies Air for Secondary Drilling

NEW YORK TRAP ROCK CORP., New York, N. Y., is using a portable, lightweight, galvanized steel pipe to distribute air in its several quarries for secondary drilling. This pipe, lengths of which are easily connected and disconnected without the use of tools, is made by Armco Drainage & Metal Products, Inc., Middletown, Ohio. The standard Rapid-Action couplings permit a working pressure of 100 p.s.i. for the 2-in. dia. pipe in use by the company. The 20-ft. lengths of pipe weigh about 26 lb. Other sizes of this special pipe available are 2-, 3-, 4-, 5-, and 6-in. O.D.

Grizzly Construction

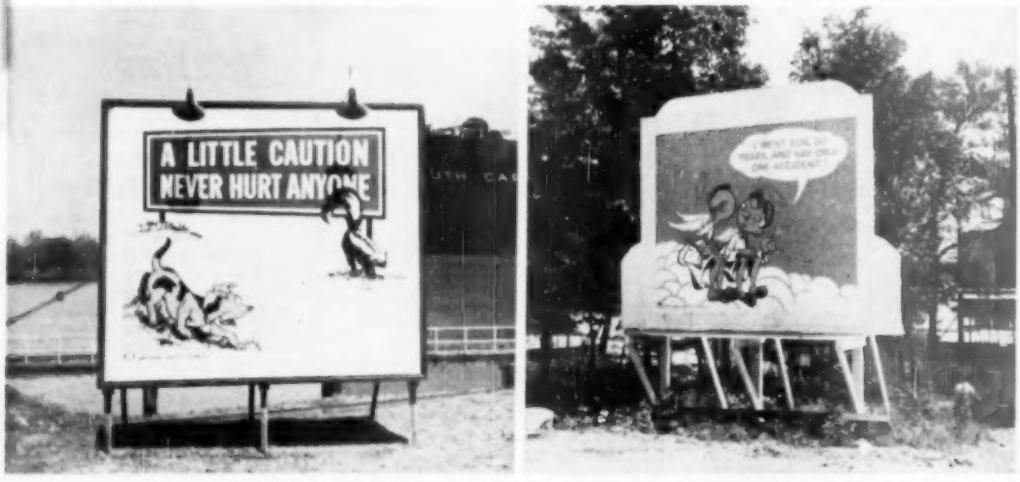
WHEN the amount of oversize is small and those pieces not too large the grizzly ahead of the primary crusher can be a very simple affair. Of course where loaded trucks drive on top of the grizzly, it must be of heavier construction than where the trucks back up to it and dump. Keeping the grizzly low facilitates dumping, and keeping it flat means that less

Grizzly ahead of primary crusher

undersize will go to the crusher. The illustration shown was taken at the new plant of Amico Sand and Gravel Co., Morrisville, N. Y. This type of grizzly suits all requirements there as oversize is small in amount and size.

Safety Reminders

ACCIDENT-FREE OPERATION of any business pays dividends, not only money-wise but in better employe relations. Pictured here are two signs in use to remind workers of the importance of safety. One is at a large eastern gypsum processing plant and the other at a dam construction site supervised by the Corps of Engineers. Both signs are located at the entrance to the plants. A humorous wording provides a more easily remembered message. The signs measure about 10 x 14 ft. and are in color.



Signs erected at the plant entrances stress safety in such a manner as to be remembered by employes

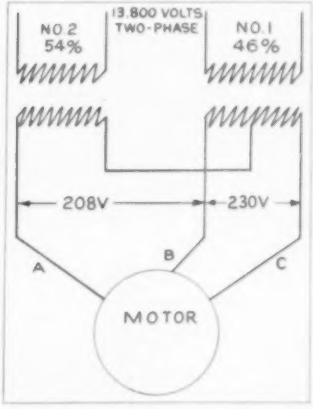
Auxiliary Stockpiling Belt

A PORTABLE stockpiling belt is used at the Portland, Ore., plant of Pacific Building Materials Co. This belt conveyor, fed by truck (see illustration), merely supplements a large radial stacker conveyor belt that is a permanent installation at this plant. When some special material or special size of stone is to be stockpiled, this portable stacker is used. The toe or feed end of the conveyor is mounted on 6- x 9-in. industrial tires and can be swung in any position and locked for use. The outboard end of the conveyor is supported on a tubular frame made from a landing gear assembly of a wrecked P-38 airplane, the air cylinders of which help absorb shock when the unit is moved about the yard. Power for the 36-in. belt on 100-ft. centers is furnished by a Wisconsin air-cooled engine mounted at the base of the tubular A-frame, which rides on 30-in. tires.

Portable stacker, fed from dump truck, used to augment permanent radial stacker belt at West Coast plant

Emergency Transformer Connections

WHEN a portable device, such as a 3-phase welding motor-generator, is to be used beyond the point of an available 3-phase circuit, this might pose a problem for the plant engineer. By the method to be described an additional phase can be obtained to serve most temporary purposes. Illustrated are two single-phase transformers with primary windings tied to a 13,800 volt, 2-phase distribution circuit. Note that the terminus of one single phase secondary winding is tied to the neutral tap of the companion transformer. Neglecting phase angle, the voltage is not in balance since a voltmeter across the secondary of No. 1 transformer reads 230 volts while a similar check across A and B legs of the secondary shows 208 volts. For motor operation the variance is not seriously detrimental since No. 1 transformer carries 46 percent of the current load and No. 2 carries 54 percent. Technically, No. 1 is known as a split phase unit because of its peculiar interrelation through its neutral tap with the full winding of transformer No. 2.



Sketch showing how emergency transformer connections are made

Old Casting Supports Bulletin Board

A WORN OUT CASTING from one of the crushers in use at an aggregates plant in the South has been put to a novel and useful purpose there. Angle iron posts have been welded to the casting and support a bulletin board which carries company messages and safety suggestions. The board is mounted between the plant and quarry where many employes pass it daily.

Bulletin board mounted on worn out casting

Truck Loading Signal

OUTPUT of a Kentucky crushed stone plant is collected in nine truck hoppers built in a square pattern with a total storage capacity of 270 tons. An interesting method has been devised for indicating which bin is to be used at the time to load trucks hauling the stone to stockpiles. A 3- x 4-ft. board, carrying numbered lights corresponding to the proper bins, is located at the entrance to the bin structure. An operator stationed over the structure can signal to the truck driver which bin is full and ready to be tapped by lighting the proper numbered indicator light on the board. This practice eliminates time lost by truck drivers in trying to attract the operator's attention or making themselves heard above the noise of the plant.

Blasting Protection

HUTS ERECTED a short distance back from the rim of a quarry in Georgia provide protection for employees during heavy blasting. The housings, made of heavy logs, are sturdy, simple and inexpensive to construct. In bad weather, they can be used as lunch rooms. Compressors and repair facilities also are located in the same area.

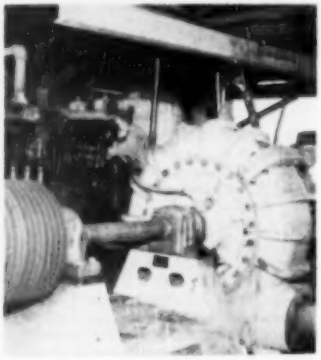
Log huts located a short distance back from the quarry protect workers during heavy blasting

New Machinery

ROCK PRODUCTS

Solids-Handling Pump

THOMAS FOUNDRIES, INC., Birmingham, Ala., is producing a new type dredge pump for the dredging, mining, sand and gravel fields. This pump,



Dredge pump designed for long life and low maintenance

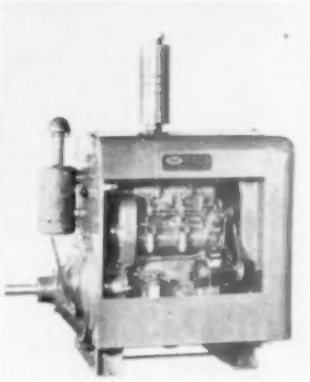
produced in a full range of sizes up to 16-in. intake capacity, is constructed of Ni-Hard, reported to be one of the hardest products of the foundry industry. Use of a comparatively nonductile but extremely abrasion-resistant material for wearing parts of the pump is made possible, according to the manufacturer, because of the design of the unit, which is a departure from the conventional. A floating suction seal has been perfected for this pump which uses a small amount of clear water to prevent the flow of abrasive-laden liquids between the impeller and side liners.

Convertible Shovel-Crane

"QUICK-WAY" TRUCK SHOVEL CO., Denver, Colo., has begun production of its model L shovel of ½-cu. yd., or ten ton, capacity. It is equipped with a 30-ft. folding-type boom and with additional attachments can be converted to trench-hoe, dragline or clamshell. Power is furnished by an International U-9 motor which can develop 55 b.hp. The basic machine weighs 12,000 lb. Five, 10, and 20 ft. boom extensions are available. Most basic parts are interchangeable with those on the "Quick-Way" model E.

Two-Cylinder Diesel Engine

HARNISCHFEGER CORP., Diesel Engine Division, Port Washington, Wis., is now in production of a two-cylinder, two-stroke, high speed diesel engine that is a companion model to its three and six cylinder engines previously produced. The new engine has a 4½-in. bore by 5½-in. stroke, and operates at a 16:1 compression ratio with a displacement of 174 in. to attain a



High speed, two-cylinder diesel engine

horsepower rating of 52.5 at 1400 r.p.m. The two-cylinder diesel engine measures 28¼ in. wide, 40⅞ in. high and 32¼ in. long.

Side-Dump Semi-Trailer Train for Quarry Operation

EASTON CAR & CONSTRUCTION CO., Easton, Penn., recently presented to the trade its new 44-ton side-dump, drop-door, hydraulically-operated semi-trailer train for quarry haulage. The first unit of this new series, built for Marquette Cement Manufacturing Co., Chicago, was demonstrated at the factory in Easton. The trailer train exhibited, powered by a Model LR Mack tractor, will be used in the Oglesby, Ill., quarry of the cement company to haul limestone on a half-mile round trip between power shovel and crusher.

The new haulage unit consists of two semi-trailers, coupled by means of a pneumatic-tired dolly. The back semi-trailer may be detached, and either trailer can be attached to the tractor. The down-folding side door of the rock body automatically opens and closes as the body is raised or lowered. Capacity of each of the bodies is 22 tons, and gross weight of the vehicle is 180,000 lb., loaded.

Two hydraulic, three-sleeve, single acting, telescopic hoists are used to raise each body. The bodies can be raised separately or simultaneously for dumping, with controls located in the driver's cab. Both trailers are equipped with Bendix-Westinghouse air brakes. The tractor-trailer train measures 57 ft. from end to end. This

Hydraulically-operated, 44-ton semi-trailer quarry train with automatic down-folding door. Controls for dumping cycle are located in tractor cab

new unit completes the line of side-dump, off-highway haulage equipment offered by this company.

Cottrell Farrel, president of Easton Car & Construction Co., was host at the demonstration, assisted by F. A. Richardson, advertising director. John Walker, New York, N. Y., represented Mack Trucks, Inc.

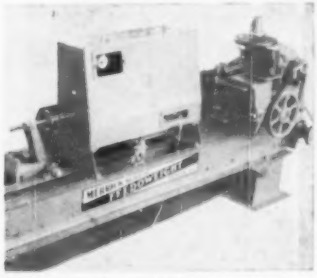
Chain-Crowd Power Shovel

LIMA SHOVEL AND CRANE DIVISION, Lima-Hamilton Corp., Lima, Ohio, has presented its new Lima Type 1002, adaptable to shovel, dragline, clamshell and crane operations. The new model is equipped with an air-control system, as are other models of the company's line. Air is utilized for hoist, crowd and retract, drag, swing, propel, boom hoist, steering, swing lock, shift from swing to propel, and engine clutch shifter functions. All shafts and the two-hoist drums are anti-friction bearing mounted.

The shovel boom is of welded box construction and is available in two lengths: 28 ft. long with a 21-ft. dipper stick, and 45 ft. long with a 32-ft. dipper stick. The shorter boom uses a 2½-cu. yd. dipper and the high-lift boom a 2-cu. yd. dipper. The basic unit can have the boom extended by addition of inserts of various lengths. These booms are of lattice type and capacity of the crane is 60 ton at a 12-ft. radius.

Feeding and Control of Small Mesh Limestone

MERRICK SCALE MANUFACTURING CO., Passaic, N. J., reports successful use of a Feedoweight to control feed of small mesh limestone to a calcining furnace so that temperature will be maintained within a range of plus or minus 50 deg. F. of firing temperature. This feeding and control arrangement consists of a Merrick WS Feedoweight, a hydraulic speed shifter and a motor linked pneumatically to a pyrometer mounted on the calcining furnace. Temperature variations as registered by the pyrometer pneumatically position the diaphragm motor link which in turn actuates the speed shifter connected to the variable speed transmission of the feeding device, thereby causing a change in feeder belt speed. Delivery of limestone to the furnace is proportional to feeder belt speed.



Temperature in a calcining furnace is controlled by this feeder to within 50 deg. F. plus or minus

Power shovel of 2½-cu. yd. capacity is equipped with air-control system

Prefabricated Plants for Heavy-Media Separation

SOUTHWESTERN ENGINEERING CO., Los Angeles, Calif., has started production of factory-built heavy-media separation plants in the 100 t.p.h. size and smaller. The process employed in the new SWECO plants is that licensed by American Zinc, Lead and Smelting Co., for which American Cyanamid Co. is technical and sales agency. Both separator vessel and densifier are Akins products, built by Colorado Iron Works. Other operating parts that are standard equipment include Allis-Chalmers, Robins, or Simplicity flat, single- or double-deck screens; Wilfley pumps and Dings "HM" Crockett-type magnetic separators.

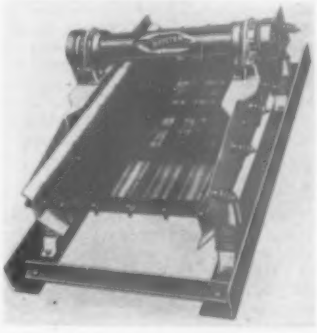
According to the manufacturer the new unit is capable of producing a middling product in one operation and in a single cleaning circuit. It is further stated that controls and layout of the plant permit one-man operation and, where desired, the operator also can maintain the unit.

Portable Crushing Unit

DENVER EQUIPMENT CO., Denver, Colo., has introduced a portable crushing unit consisting of a jaw crusher mounted on a four-wheeled truck equipped with hydraulic or mechanical brakes. Either all-steel wheels or pneumatic tires may be furnished. Power is supplied from an accompanying gasoline or diesel engine. Crusher sizes range from 9 x 12 in. to 15 x 36 in. The unit, towed by truck or tractor, was designed for mine or quarry exploration or other small scale or temporary work.

Vibrating Screen for Agstone

DEISTER MACHINE CO., Fort Wayne, Ind., has developed a vibrating screen that is said to be particularly adapted to agricultural limestone or other materials that tend to blind easily. In order to permit a longer stroke and higher speed (approximately 2000 r.p.m.), strong lightweight alloys have been used in its construction. Side plates, for example, are alloy steel, which permits thinner sections. The cross members and revolving shaft of the vibrating mechanism are tubular in order to limit weight. The shaft is supported on each end by spherical roller bearings that operate in an oil bath. The vibrating mechanism of these screens is demountable as a unit and interchangeable from screen to screen, which is a possible advantage where screens are operated in batteries. The screen may be driven from either side, as the grooved flywheel is interchangeable with a blank flywheel on the opposite end. Throw is simply adjusted, according to the manufacturer.



High-speed, long-stroke vibrating screen developed for agstone

Winch-Operated Dump Trailer

WINCH-LIFT, INC., Shreveport, La., is in production of its new cable-operated Model 500 dump trailer, which is claimed to embody new features that will allow the unit to dump

Cable-operated, light-weight dump trailer

at an angle without overturning or twisting of support arms. This cable-operated trailer can be maneuvered into a jackknife position to dump, can spread-dump while in motion, or can spot-dump with the body at an angle up to 60 deg. The new model, Clement 500, has a lighter body design and a lower center of gravity. The trailer incorporates a fifth wheel which is said to enable the operator to attach or free the trailer quickly with the minimum of effort.

Swivels Prevent Wire Twisting

GENERAL MACHINE & WELDING WORKS, Pomona, Calif., announces availability of the Miller angular thrust ball bearing swivel in a wide range of capacities which can handle up to 23-ton working loads with a safety factor of more than 5 to 1. The swivel, which is said to prevent twisting and kinking of wire lines in strung hoisting blocks, should be applicable when using drop balls in quarries for secondary breakage. Complete assemblies can be obtained combining the swivel with various sizes of blocks and hooks. The swivel also can be inserted in blocks now in use.

Add to Power Shovel Line

BUCYRUS-ERIE CO., So. Milwaukee, Wis., announced recently the addition of a new 2-cu. yd. power shovel to its line that now ranges from ¾- to 2½-cu. yd. models. The new unit is obtainable with either diesel or electric power source and is convertible in the field for shovel, crane, dragline or clamshell service. According to the manufacturer, an important front-end feature is that the twin-rope crowd is fully independent of hoist so that full engine power may be applied to the crowd if necessary. Main hoist, swing, boom hoist, crowd and retract machinery operate on anti-friction bearings. For dragline and clamshell service, booms are available from 50 to 90 ft. in length, and may be obtained in lengths up to 110 ft.

Heat Recuperator

ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis., has announced a new heat recuperating kiln process for wet as well as dry cement manufacture. This new system is reported to be highly efficient and a marked improvement over the original heat recuperating kiln system invented by Dr. O. G. Lellep approximately 22 years ago. Dr. Lellep is now with the manufacturer and has been instrumental in the design of the new A-C-L kiln system.

In principle, the new unit receives its feed in the form of pellets approximately ½ in. in dia., made of moistened dry cement raw mix or crushed filter cake. These pellets are carried to the rotary kiln on a traveling grate passing through a two-compartment chamber. As the porous bed of pelletized raw material passes through this chamber, hot gases from the rotary kiln are passed through the bed of material twice. When the material enters the kiln, calcination is approximately 30 percent completed. The new unit is about ⅓ the length of a conventional long kiln. Fuel economies are said to result from the use of the device in either wet or dry process cement manufacture, with fuel consumption being in the neighborhood of 700,000 B.t.u. per bbl. of cement clinker.

Redesigns Truck Line

INTERNATIONAL HARVESTER CO., Motor Truck Division, Chicago, Ill., has completely redesigned and re-engineered its line of trucks. The new series, designated as L-line, consists of 87 separate truck chassis models. According to the manufacturer the L series is a complete line of heavy-duty trucks designed to handle every con-

One of 87 chassis models in newly designed line

ceivable type of hauling job.

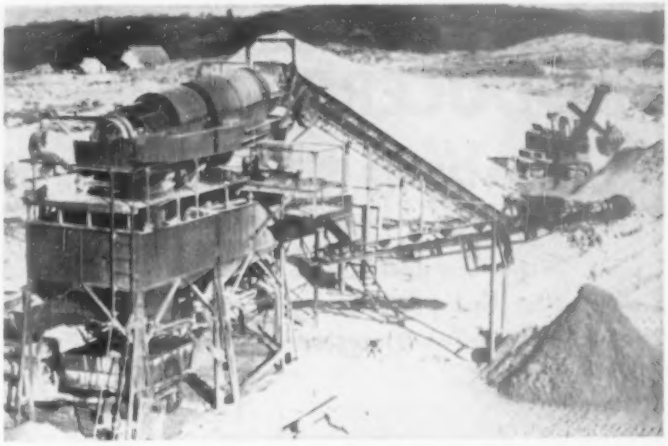
The new models have a larger cab which includes a curved windshield to give unobstructed vision. Chassis dimensions have been designed to afford better load distribution, greater maneuverability, shorter overall lengths and improved engine accessibility. This shorter wheelbase has not decreased the load-carrying length. The three types of engine available with this truck line range in hp. from 100 to 162. Main transmissions available include: two sizes of 3-speed, a 4-speed sliding gear, a 4-speed Synchro-shift, four sizes of heavy-duty 5-speed constant mesh, with direct or overdrive in fifth, and a 5-speed Synchro-shift model.

Power shovel of 2-cu. yd. capacity with crowd fully independent of hoist

Prefabricated Washing Plant

PIONEER ENGINEERING WORKS, INC., Minneapolis, Minn., is now in production on its new Model 305-W gravel washing plant. Capacity of this plant is 350 to 400 cu. yd. of sand and 110 to 200 cu. yd. of sized and washed gravel per day. Principal units of the plant are: an 18-in. wide belt conveyor on 70-ft. centers that transfers pit-run material from a field hopper to the plant, which is fed by a 24-in. reciprocating plate feeder; 42-in. dia. revolving screen that is 21 ft. 8 in. long; two 21-cu. yd. storage bins; a 32- and a 48-in. sand dewaterer, and a short belt conveyor to stockpile sand production.

One of these plants is in operation at Baraboo, Wis., producing sand and gravel aggregate for a ready-mixed concrete plant and concrete products operation, Baraboo Concrete Products Co., owned by Al Brown.



Sand and gravel washing and grading plant producing concrete aggregate at Baraboo, Wis.

New Type Welder

THE LINCOLN ELECTRIC CO., Cleveland, Ohio, has announced a 200 amp. a.c. industrial type welder. Electrodes ranging in diameter size from 5/64 in. to ¼ in. may be used with it. Low-current welding of thin sheets is simplified and high-current welding of heavy plate is accomplished faster through a Lincoln Arc Booster, the firm states. The booster adjusts the welder to start the arc automatically when the electrode touches the work on either thin or heavy material.

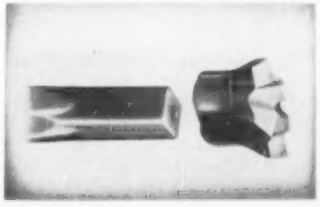
Stray Current Detector

E. I. DU PONT DE NEMOURS & CO., Wilmington, Del., has developed the "Detect-A-Meter"—a combination stray current detector and blasting galvanometer. This unit, which works on a.c. or d.c., has two scales, one, a low range from 0 to 2.5 volts, allowing detection of voltage as low as 0.1 volt, and the other a high range from 0 to 25 volts. The new device also performs all the functions of the blasting galvanometer for checking blasting caps and firing circuits before connecting the blast wires.

Combination galvanometer and stray current detector

One-Use Rock Bit

TIMKEN ROLLER BEARING CO., Canton, Ohio, now offers its newly developed "Spiralock," a one-use rock bit designed for use where bit reconditioning is impractical or undesirable. According to the manufacturer it is designed for fast drilling at low cost, and offers the following advantages: 1) Ease of attachment or removal from drill steel. 2) Stays on longer due to its square socket that spirals slightly as it recedes. 3) Non-choking back face because it is scalloped and rounded off. 4) Non-rifling, due to its "X" cutting edge. 5) Due to its design or union, steels last longer and are easier to prepare. Existing drill steels of any size and section can be adapted to the new bit. 6) Ease of starting and centering due to crowned chisel pilot. It is made from Timken electric furnace steel.



Bit designed for use where reconditioning is impractical

Low Cost Welder

HOBART BROTHERS CO., Troy, Ohio, has developed a new line of low cost welders, the "Bantam Champ" d.c. arc welders. Shown in the illustration is the electric motor driven Model MZ-200-S, rated 200 amperes at 30 volts on 50 percent duty cycle. The current range is from 40 to 250 amperes at an operating speed of 3450 r.p.m. The generator is a modified multi-range type with four laminated main poles and four interpoles which are removable. Four heavy duty generator brushes are held in a fixed neutral position by patented single unit brush rigging.

Other features listed by the manufacturer are modified multi-range dual control welding controls, with 5 ranges of welding current and 100 steps of volt-ampere adjustment in each range, making available 500 combinations of open circuit voltage and welding current for selecting any desired arc characteristics. The main switch is heavy copper, moulded in bakelite, controlled by a large, hard-rubber covered hand wheel. A squirrel cage induction type electric motor is used and its rotor bars are welded to form a solid copper squirrel cage.

Electric motor driven arc welder

Outlook:

PRODUCERS OPTIMISTIC About Business Prospects in 1950

Service and quality to be stressed in competition for business during 1950. High taxes, distrust of government and unfavorable labor situation are the principal obstacles to be faced, according to letter poll of industry

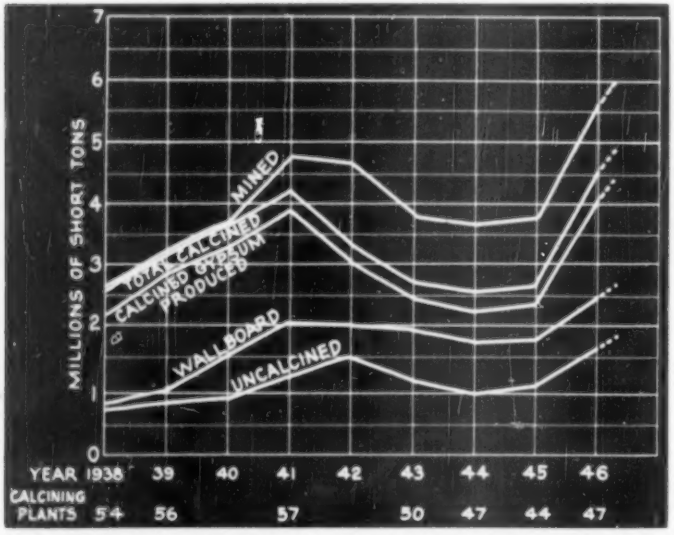
By BROR NORDBERG

OUR YEARLY LETTER to producers of rock products and concrete products, requesting opinion as to the business outlook for 1950, indicates that these industries, with very few exceptions, will establish new production records in the year ahead. There was almost universal optimism that volume of business will be excellent; yet, it was just as universally expressed that competition for business will be keen and that prices, service and quality of product will determine the course of business throughout next year. We have definitely reached the stage where meeting of competition has become the number one problem facing the industry.

Since our letter to producers a year ago industry, generally, has been confronted with new problems of serious implications, and these particular industries have begun to experience the effects of new competitive conditions and obstacles that apply specifically to their operations and products. It was in an attempt to develop discussion of these problems that we sent our letter.

The number of replies received was gratifying and we thank those who took the time to put their thoughts in writing. More than 40 states, and all branches of the industry, were represented in the returns so we believe our summary to be truly representative.

In requesting opinion as to the outlook for business in 1950 as compared to 1949, a division percentagewise between private and public work and according to use was also requested. We asked whether or not more intensive merchandising and the rendering of better service were considered as necessary in 1950, and for comments on the principal obstacles to doing business in 1950. In the field of labor, opinion was requested as to how more steady employment might be accomplished and how the problem of providing pensions might be met should it arise. Aggregates producers were asked the status of portable plant competition and whether or not local specifications were being influenced by the highly controversial U. S. War Department specifications for aggregates which became so prominent in 1940 for the building of mass concrete structures.



Gypsum mined and calcined gypsum produced refer only to domestic production; while total uncalcined, total calcined, and wallboard produced includes domestic production, imported tonnage and by-product crude gypsum. Figures for wallboard include tonnage used in production of wallboard, lath, sheeting and laminated board. All figures given in short tons

Outlook for Business

It is significant that 47 percent of all producers who commented on the business outlook, predicted they would do a larger volume in 1950 than they did in 1949, and that 39 percent expect an equal volume. The year 1949 was one of extraordinary high production and, from our own observations in travel, it is probable that many producers who anticipate operating at 1949 levels would have predicted larger volume in 1950 if their 1949 production had not already been at peak capacity.

In a good number of cases, increased volume was predicted for the first half of 1950, and the second half of the year was considered uncertain. Price declines were anticipated by many, due to the inroads of new competition and because of increased operating efficiency of established competitors. Increases in volume of sales for those who predicted better business possibly averaged 10 to 15 percent although they were as high as 30 and 50 percent for a few producers and 100 percent for a producer in Massachusetts where a large bond

issue has been floated for highway construction.

Increased activity in highway construction was the main factor in cases where substantial increase in volume of aggregates was predicted. For example, in Pennsylvania the extension of the Turnpike is largely responsible for a predicted increase of 20 percent in volume of crushed stone in a state that has had a high volume of highway construction these past several years. Aggregates producers in Kentucky and Tennessee are optimistic because these states have the largest highway building programs in history.

Highway construction, nationally, according to estimates of government, will be 15 percent higher in dollar volume in 1950, and will total $1.9 billion, as judged from the activities of the states and other subdivisions of government in providing funds from increased gasoline taxes and bond issues. Physical volume will be higher also as a result. There has been a continuous trend upward in highway building since the end of the war and, in the next three or four years, the dollar volume is expected to reach $3 billion annually. According to estimates of the Bureau of Public Roads, that figure will have to maintain for 15 to 20 years in order to modernize and build roads to meet the demands of traffic.

The division of anticipated volume, between public and private work, varies considerably and no conclusions could be drawn from a summary of letter replies other than that public work will be proportionately increased. Conditions in each community were governing and, while many producers predicted a 50:50 ratio or thereabouts, the proportion ranged from as low as 10 percent public work to as high as 95 percent. Many predicted increased volume of business in fields of general construction other than highways, which is substantiated by national surveys.

According to estimates of the U. S. Departments of Commerce and Labor, another record year for dollar volume of construction will be established in 1950 and should be not less than the $19¼ billion total of 1949. These sources predict a drop of $925 million in private building to $13.1 billion in 1950 mainly in residential, nonresidential, farm and public utility construction; and that increased public construction will at least compensate for this decline. Industrial construction and other private nonresidential building will decline 26 percent and 7 percent, respectively, according to estimates. Private commercial building, on the other hand, likely will increase to meet demands for shopping districts, etc., as population shifts from metropolitan to suburban communities. Farm construction is expected to continue an easing off in proportion to decline in farm income.

Public building is expected to increase at least $6.1 billion or 18 percent over 1949 totals with the largest percentage increase in housing with an 82 percent rise in the value of new residential building. Educational building will also increase as will the construction of sewers, water facilities, etc. There will likely be a 20 percent increase in conservation and development work by the federal government.

The federal government's entry into the field of subsidized construction, under the Housing Act of 1949, is expected to make available $3 billion during the next six years for loans and grants to clear slums, for housing projects and for repair of farm buildings. Influence of this new development in housing will help keep construction at a high level for many years ahead since the program is to be projected into the future at least as far as the year 1994.

In the field of industry itself, the steel strike has had the effect of deferring much activity and, as a result, the steel industry itself and industries immediately dependent upon it will operate at an accelerated pace at least through the first one-third of 1950 just to catch up with demand.

Producers who indicated they would have lower volume of business in 1950 than in 1949, in nearly all cases, indicated that volume would still be good. No geographical significance was noted. Predicted decreases were small except for a few instances where producers have completed large public projects which inflated 1949 production far over normal levels.

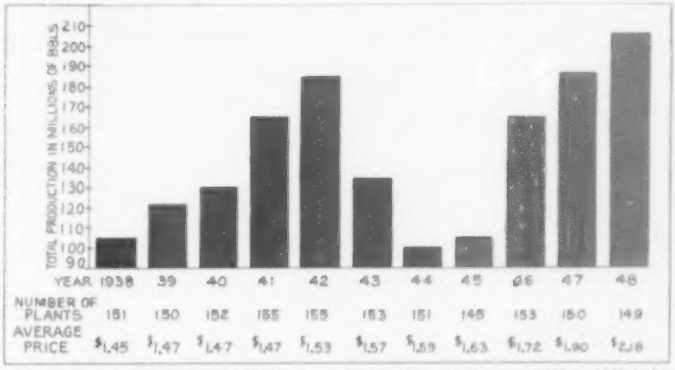
A limited number of typical comments on business prospects, which indicates the variations in outlets and relative proportions by use, follows:

A producer of lime and limestone products in the far west said:

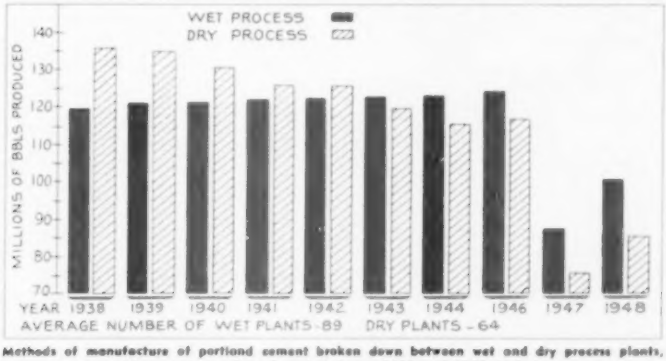
"We believe that 1950 will produce in dollar volume, as well as in tonnage volume, an amount similar to that which was produced in 1949. We expect, however, that if a new product which we are going to start manufacturing in February is successful that it will enlarge our geographical market, as well as enlarge our tonnage and dollar market. In our particular instance private work, chiefly housing, metallurgical and chemical requirements will supply at least 90 percent of our total volume."

A concrete products manufacturer in Florida:

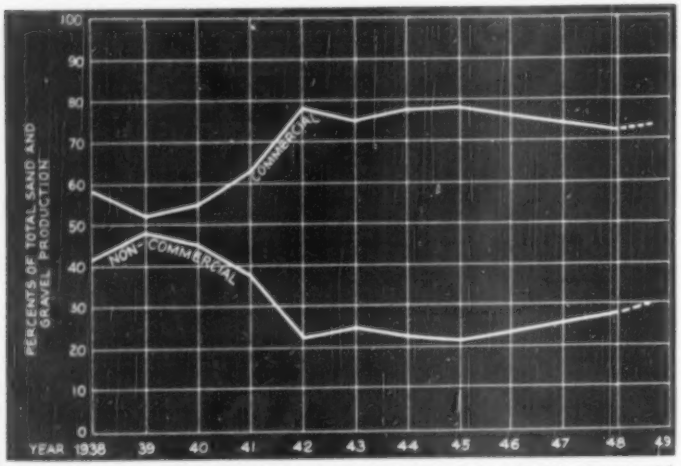
"The outlook for business in 1950 in this area would indicate at least the



Portland cement production and mill shipments, given in bbls., for the years 1938 to 1948 inclusive, together with average price per bbl. and number of active plants



Methods of manufacture of portland cement broken down between wet and dry process plants, with average number of each between 1938 and 1947, inclusive



Percentages of total sand and gravel production divided between commercial and non-commercial (government and contractor) plants

same volume as we have enjoyed this year. It is expected that the first half will be at least 10 percent better than the last period of this year, and even though the second half will show a slight decline, the year as a whole should be comparable.

"In 1949 the division of business percentage would indicate about 75 percent private against 25 percent public works. The public works was divided at about 15 percent roads and 10 percent school. In 1950 it is expected that private building will fall off as much as 30 percent, but this will be taken up by schools, hospitals and roads in about equal proportion."

Producers of crushed stone in Kentucky:

"The outlook insofar as it affects the production of crushed stone in Kentucky is that it will be about equal to 1949. As you may know, the State Highway Department of Kentucky in 1949 broke all previous records for contract lettings and as of this date has awarded work slightly in excess of $36 million. I do not look for quite this volume in 1950 but it should pass the $30 million mark."

A producer of lime and gypsum products throughout the East:

"In general, we feel that 1950 will be almost as good a year as 1948 for the producers of building materials. Any falling off in sales will be moderate and we look forward to a year in which prices are level and labor stabilized.

"Government activity in the residential construction field will show a marked increase. However, it is difficult to say how rapidly the new program will get underway. For that reason, we cannot estimate the percentage of total starts that this will represent. We feel, though, that there will be some falling off in privately financed residential building so government activity will represent a larger percentage of the total."

A concrete products manufacturer in Indiana:

"We believe business in 1950 will exceed that for 1949 in dollar volume, generally, providing unforeseen tie-ups in production do not reach an extreme. There seems to be more prospective work being discussed at this time than there was a year ago."

A manufacturer of lightweight aggregates merchandised nationally:

"We feel that the business outlook for 1950 is definitely encouraging. The year 1949 has been the best in our history, and all indications are that 1950 will be even better, barring unforeseen complications. Everything we see in our business indicates that there will be considerably more public building, such as schools, hospitals, etc., large commercial and industrial structures; and a considerable number of large private buildings, such as churches."

Limestone and agricultural limestone producers in Missouri:

"Business in 1950 will be better than in 1949, as far as the crushed stone and agricultural limestone industries are concerned in Missouri. This statement is based upon the fact that the local building business is expecting increased activity during the next 12 months and there will be more incentives from federal and state agency sources during that period."

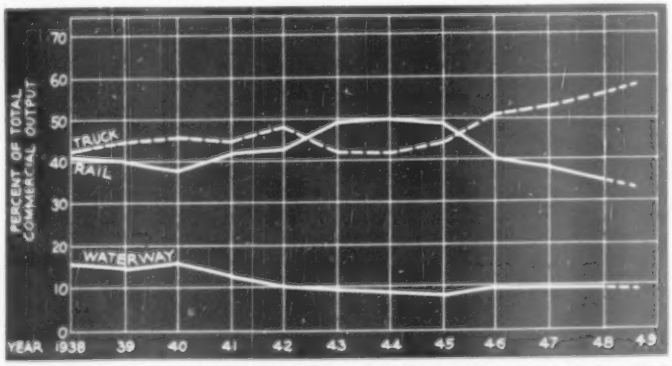
A Mississippi sand and gravel producer:

"We are expecting more tonnage in 1950 than we had in 1949. We believe that public works programs give us more direct benefit than does a condition of general boom times, that is, we get the money first and second hand rather than fourth and fifth hand. We believe public works will increase to absorb unemployment. Also, the state of Mississippi will have a road program in 1950 of some kind even though the recent special session of our legislature failed to pass enabling acts and revenues for it.

"From a tonnage standpoint, railroad ballast will be 33 percent of our total, roads will take 32 percent and the remaining 33 percent will be housing, concrete products (pipe, block, etc.), public buildings, etc. From a dollar and cents standpoint these percentages will differ. Public works will take the volume, such as schools, roads, federal-aid hospitals, city and county improvements (curb & gutter, sewers, playgrounds, etc.). In fact, behind the scenes, most private work is the result of a federal loan."

A California manufacturer commented, typically of other cement manufacturers, as follows:

"As this is being written in mid-December, it seems apparent that our shipments of cement for the year 1949 will surpass all previous peaks in terms of both tonnage and dollar value. This marks the third successive year for which we can report such achievement. However, aggressive selling has been necessary to make possible such record-breaking volume.

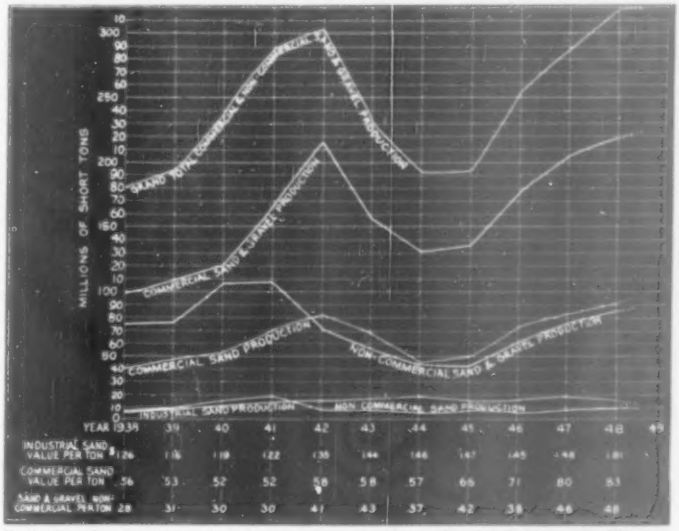


Principal methods of shipment employed for total commercial output of sand and gravel from 1938 to 1948, inclusive

Our sales campaign has involved several features: We have augmented and strengthened our sales force; greater attention has been given to service and advertising; and finally, we have rounded out our line of specialty cements.

"Indications are that production and shipments of our cement for 1950 will be approximately equal to the 1949 figures, and may possibly surpass them. We expect the demand for housing and for industrial and commercial construction to continue in 1950 the moderately lower trend shown during the year past. However, this decline should be more than balanced in this part of the country by a substantial increase in expenditures for public construction. We estimate that a little over half of our shipments for the year ahead will be made to federal, state and county projects: for flood control, irrigation, highways, schools and hospitals."

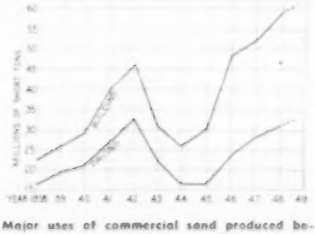
All indications are that industry production curves, generally, will continue upward through 1950 at least and that volume of business will continue at the higher tonnage levels that the industry has established since the end of the war. Charts and graphs shown herewith illustrate the tonnage trends of the larger volume branches of the rock products industries. Also shown are price trends, trends in uses for certain products and distribution methods. Data for these charts were compiled from publications of the U. S. Bureau of Mines.



Production of commercial and non-commercial sand and gravel and industrial sand. This last includes glass, molding or foundry, grinding and polishing, fire or furnace, engine, and filter sand. Non-commercial sands include government and contractor plant production. All figures are short tons

Merchandising

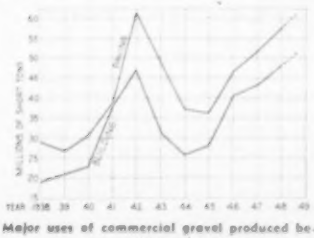
In reply to a question as to whether or not it is becoming necessary to merchandise more aggressively in the competition for business, with few exceptions producers answered in the affirmative. About five percent indicated that business is still available without sales effort but, of the other 95 percent, most said that competition is gaining in momentum and that it was requiring more effort to find customers, to sell them and retain them. Inquiries must be followed more closely and customers are demanding more personal attention and service, and more attention is required in making deliveries. Long-established producers are feeling the effects of competition from the many new concerns that came into existence in recent years, and there are more bidders for every contract. As a result, price competition is becoming a factor and there is some evidence of price-cutting, particularly in the concrete products industry, to levels that cut seriously into profits. Purchasers are displaying considerable price resistance. Some of the new competition, with high production and efficient machinery, is seriously cutting in on the older producers. It is of interest that several sand and gravel producers are finding themselves handicapped because they do not produce ready-mixed concrete and therefore are unable to render the service of delivering concrete as such. There is also evidence that the sand and gravel and the crushed stone industries are starting to compete vigorously in some areas on the basis of the relative merits of the two aggregates. Sales forces are in process of being expanded. The situation seems to be as one producer expressed it: "We must hold down production costs and maintain quality while building sales in the face of heavy competition."



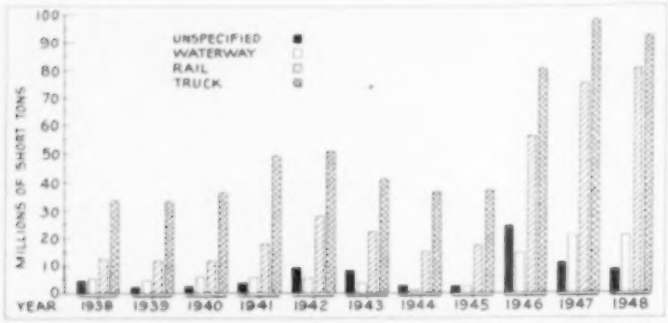
Major uses of commercial sand produced between 1938 and 1948

Among the obstacles to doing business in the year ahead, aside from the competitive situation, taxes are the principal headache of producers. Then, in the order of mentions, follow unions and the unfavorable labor situation (including labor costs), lack of confidence in the sincerity of the federal government in its relations with business, high production and selling costs, high freight rates which restrict sales areas, and government attempts to control and supervise factors that are necessary to the maintenance of free enterprise. To meet competition, some producers anticipate the need to install higher production facilities to effect lower unit costs and, because of high taxes and overall operating costs, hesitate to make the investment in the face of uncertainties. Customers are, in some cases, getting more critical in requiring rigid adherence to specifications.

Unreasonable demands of labor unions for wages and pensions, with the threat of eventual regimentation of industry, of all the labor considerations, are of utmost concern. Labor unrest, as a result, and its continued low productivity are proving bothersome. Other obstacles mentioned were: (1) competition from local pits; (2) credit uncertainty of home owners; (3) lack of venture capital; (4) increased credit buying and slower collections; (5) high costs and shortages of coal; (6) shortages of railroad cars; (7) high costs of machinery and its maintenance; (8) the U. S. War Department specifications for aggregates; (9) basing points; (10) lowered farm income; (11) lack of highway engineers; (12) high construction costs; (13) lack of funds for



Major uses of commercial gravel produced between 1938 and 1948



Principal methods of shipment employed for commercial crushed stone. Years 1946, 1947 and 1948 show total production and include such tonnages as railroad ballast produced by railroad companies for their own use

building by states, counties and cities; (14) cement shortages; and (15) government competition for materials.

Comments on the competitive situation and handicaps to doing business were, typically, as follows:

A cement manufacturer in the West:

"Several competing cement mills are closer to the important centers of population than is our plant. Although this handicap in location has been obscured during the recent period of unprecedented demand, the fact remains that percentagewise increases in freight rates during the past few years have removed large segments of our marketing area.

"The shrinking of our markets by Ex Partes 162, 166 and 168 constitutes the principal obstacle to doing business in 1950, and in the years to follow. This widening spread in freight rates between ourselves and the other cement mills will make it more and more difficult for us to compete in the large consuming points on the same terms as we did in the past."

A large slag producer:

"Quite definitely it is necessary to sell against competitors now. The honeymoon is over and the aggressive salesmen will secure probably a larger percentage of the business available. It is essential that good service be rendered today and a good product furnished to satisfy a more exacting trade.

"I do not wish to appear trite when I say government attempt at supervision and controlling of the factors that make up free enterprise will continue to be the principal obstacle in business."

A concrete block manufacturer in Pennsylvania:

"Of growing concern to many block manufacturers is the credit uncertainty of prospective new home owners. If the contractor, whose credit is known, is given a discount or commission for all materials purchased, he will in turn be held responsible for the account.

"Most individuals will permit the contractor to buy the block and other building materials if he is approached correctly. For instance, a builder will estimate more accurately and at the same time he will order the materials at the time they are needed.

"I would rather have a reputable contractor owe me $10,000 than 20 individuals each owe $500. A contractor who has been given a discount above that which individuals can receive, will return again. His business is vital to us."

A producer of ready-mixed concrete in the Southwest:

"Competition in this area has always been rather keen. We maintain an aggressive sales attitude and are constantly endeavoring to improve our service facilities. We feel that any let-down in this policy for 1950 would be immediately reflected in decreased sales. However, this is a healthy condition and we believe results in a greater over-all use of ready-mixed concrete."

A crushed limestone producer in Ohio:

"Business is becoming increasingly more difficult to secure. It follows that greater effort in selling and in servicing the trade will be required. With less total volume of business available and with production facilities geared to the high levels established during the war and since it will lead to intensified competition through the greater availability of materials. Higher selling costs will be encountered and production costs on the average will increase due to reduced volume and more particularly to the ever increasing demands of labor."

A producer of lime in Ohio:

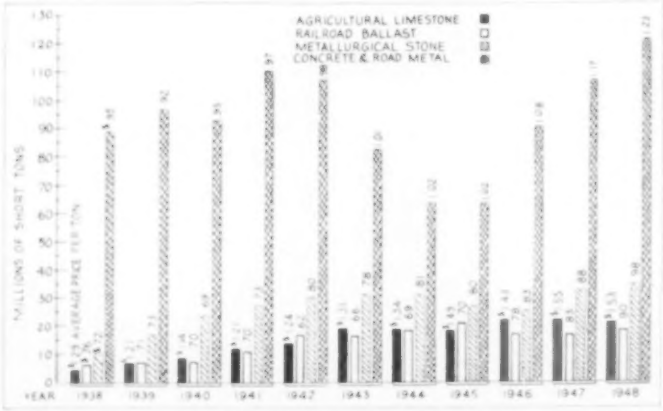
"Business is getting more competitive due to the increased production during recent years, and the fact that we have now about caught up with the production capacity of our plant with demand. It is necessary to merchandise more aggressively and render more service in the competition for business.

"The principal obstacles to doing business in 1950 are the political labor racketeers. For example, we are told that Mr. Truman was sympathetic to Phil Murray's demand on steel and Walter Ruether's demand on the automobile industry. As long as our political leaders encourage labor leaders in their demands for higher wages, pensions, insurance and other concessions, which increase the cost of doing business, we will undoubtedly have difficulty in operating the industries without interruptions. The interruptions this year in coal and steel alone cost Uncle Sam billions of dollars in loss of taxes. These strikes are also a severe blow to both industry and labor."

A Southern producer of sand and gravel:

"Business is harder to get, competition is tougher and several newcomers in the business are finding the going rough and are cutting prices in order to maintain volume. They are learning or leaving the hard way.

"The principal obstacle in 1950 is going to be adjusting business policies and practices to meet or stay ahead of the ever increasing tax load. The



Four principal uses for crushed stone. Figures given in short tons with average value per ton

rate of taxes—'The War-Time Emergency Taxes'—has not been lowered but the things taxed have increased, therefore there has been an increase in the war-time emergency taxes, for instance the tax on telephone calls, freight rates, passenger fares, etc. I think we could do all right if Congress would adjourn and stay adjourned for four or five years. Then if the ICC would disband, everything would be still better."

A ready-mixed concrete producer in Ohio:

"Competition is definitely keener. Demands for prompt as well as special service, and for lower prices are the rule of the day. Higher labor rates, higher freight rates, and increased production costs in general are factors that prevent price decrease at the present time. High taxes are draining off too much of our capital and seriously interfering with replacement of worn equipment. This factor alone tends to slow down production, hence increases costs."

A producer of sand and gravel in Tennessee:

"Business was harder to secure for the greater part of 1949. It is becoming necessary to follow inquires more closely. We expect increased costs, such as scattered wage increases, for our repair parts and supplies, and the direct taxes that will have to be passed on to our customers will have a tendency to discourage private spending."

A Midwestern producer of concrete products:

"We find it necessary to merchandise and stress our service more to customers as well as search for prospective customers. In other words the trend is toward a more normal buying and selling situation with stress on selling.

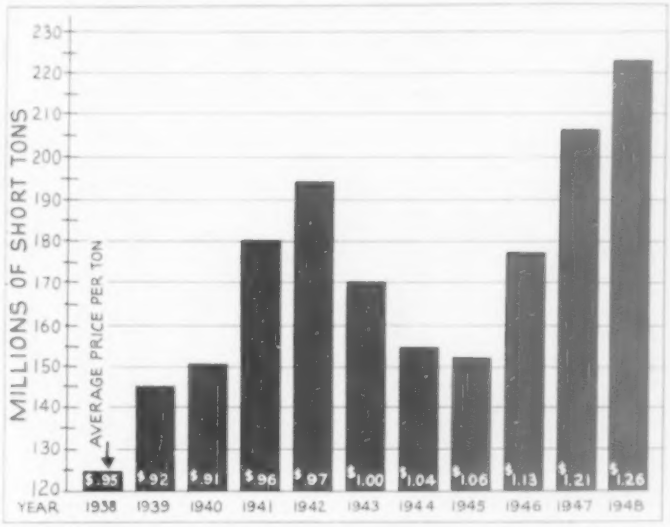
"Principal obstacles to business for 1950 appear to be strikes and otherwise prohibited production which lead to lay-offs and reduced bank accounts on the one hand and raised consumer costs on the other. A leveling off of wage scales and other production costs and a co-operative feeling between employer and employe would tend to stabilize consumer prices and emphasize business prospects for the year."

A large aggregates producer in Minnesota:

"We hired our first employe whose sole duty is to sell our products. There is no principal obstacle to running the business, but purchasing agencies like the state, county, and city lack funds. Industry, because of the tax situation, has little left to use for expansion of facilities without stock issue, bonds, or borrowing from banks."

A small concrete products manufacturer in Wisconsin:

"Business is definitely harder to get. I find that besides offering a superior product I must also advertise more and meet the prices of my competitors. The principal obstacle to doing business, at least new business, in 1950 will be fear of big government and I believe that this fear will eventually lead us into a depression."



Total crushed stone production in short tons and average price per ton for years 1938 to 1948, inclusive

Crushed stone industry in Missouri:

"Business will not come easy although there will be more of it. Crushed stone men and limestone producers who will get new business will find that they must perform a good selling campaign. They will have to spend more time before their potential customers and less time sitting at their desks.

"This business will find a marked increase in competition between producers and resultant lower prices in most cases, causing a situation in which successful producers will concentrate on economy of production costs and other costs of doing business. There probably will be increased demand from customers for improved quality, better service and accurate weights. The efficient producer who handles his business with integrity and sound business principles will make some money in 1950."

A sand and gravel producer in Washington State:

"I think there should be a concentrated effort to tell our congressmen that we want many government bureaus done away with; some of the taxes which were supposed to be temporary during the war eliminated or reduced such as taxes on telegrams and long distance telephone calls, excise taxes, transportation taxes and many others.

"Why not suggest to your readers to urge their congressmen to cut out the frills and get down to only the essentials of good government. Do the same with our city, county and state governments."

A concrete products manufacturer:

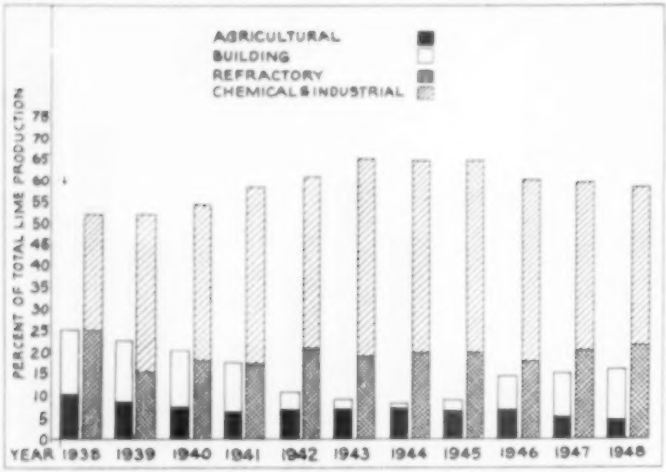
"We have not found business harder to get, but have found aggressive merchandising and service a necessity. We have built our business on this principle and our competitors are now beginning to appreciate its necessity. Price also is becoming more and more of a factor.

"The principle obstacles anticipated in 1950 will be increased price consciousness and a tendency to seek longer credit terms, especially where government financing is used. This means either additional working capital through borrowed money or piling back earnings to carry accounts receivable."

A Michigan concrete block manufacturer:

"Competition has been strong here for the past two seasons and I have had to go out after everything I could get. My main business is block manufacturing but I am going to diversify my business to make up for the business that I have lost in areas where other plants have sprung up. There are seven plants now serving an area that was served by three. We increased our capacity about the same time the new plants sprung up and it has been hard to take.

"My principal obstacle in doing business in 1950 is to try and get the block producers in this area to get together on a price that will render a profit and put a stop to cut-throat competition. My credit business is increasing and it is taking more capital to operate. Our losses in bad accounts have been very small. If lightweight



Uses of lime between 1938 and 1948, given in percent of total production. Chemical and industrial lime includes amount used by producers (captive tonnage), while refractory lime equals dead burned dolomite

aggregates were available in quantity I would increase my business tri-fold."

Guaranteed Work—Pensions

In view of the fact that the 1949 Wage-Hour Act does provide certain exemptions from the payment of overtime wages, such as permitting a 12-hr. day or 56 hours of work per week, under certain conditions in some labor contracts, it would be to the advantage of employers to stabilize employment.

In comments to this question, many employers acknowledge that it would be desirable to provide steady employment that could be guaranteed but, because of seasonability in their localities, cannot determine how it should be done. Many southern producers of course, are providing year-around employment.

Steady employment, as some expressed it, depends upon having steady markets and the question is how to guarantee outlets the year around. The turnover of labor in the construction industries was mentioned as another condition that would make it impossible.

Some of the suggested solutions that might stabilize employment at least to a degree or enable progress to be made in that direction were: (1) a shorter work week; (2) longer working hours; (3) better screening of employes before hiring them in order to secure dependable workers of high productivity; (4) diversification of products and markets; (5) the building of stocks in off-peak seasons; (6) acceptance only of contracts that can be completed with the normal crews of men; (7) planning ahead for contracts; (8) working with consumers to have them stockpile products during off-seasons. One producer said he put on larger haulage units in order to cut the crews of drivers at his plant. Other suggestions were to repeal the Wage-Hour Act and reduce taxes.

In answer to the question as to how small concerns would meet the problem of providing pensions for employes, if they should have to face the possibility, the majority do not believe it practicable for each employer to provide such protection. The main reason given is that the cost of pensions would add to prices which must be passed on to the consumer anyhow, and would help accelerate the failure of individual businesses, some of which are likely to be forced out of business anyhow in a competitive market. Then, there would be no pension funds available.

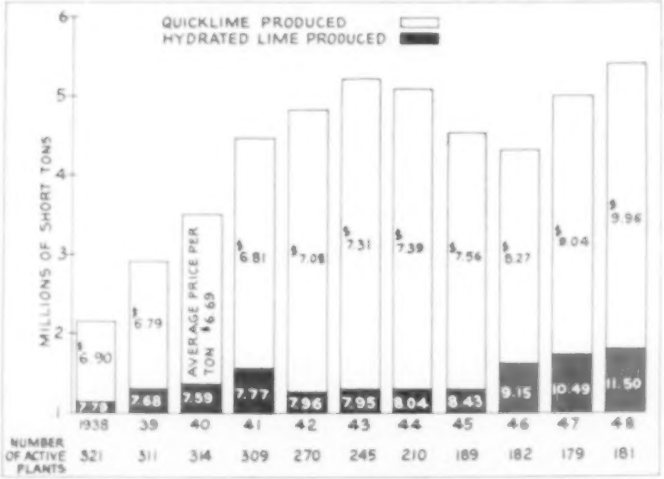
A considerable number believe, if employers in small businesses must someday provide pensions, that that is government's responsibility in order to treat all alike. Many producers, on the other hand, believe government should be kept out of the picture as a matter of policy while still others feel the same way about it because of the government's inefficiency as proven in other fields. Other solutions suggested were through extension of social security or through insurance with private insurance companies to which the employer and employe both contribute. It is general opinion that employes should be required to contribute to any plan of pensions.

Quite a few producers believe that pensions have no place in bargaining nor in a free nation and that the practice is un-American. They suggest that every effort be made to dissuade labor from asking pensions from industries like these due to the seasonality of the industries and the low prices of the commodities produced. Some of the larger producers already have pension plans in effect.

Comments from producers on the two foregoing subjects were like the following:

A cement manufacturer in the East:

"Steady employment, of course, must depend on steady market. At present we have it. How to continue it indefinitely is beyond my knowledge. We think we will be faced with providing pensions, but in view of the possibility of increased pensions via the government route we think that any negotiations should be for total pension, regardless of its source."



Quicklime and hydrated lime produced, in short tons, together with average price per ton and number of active plants

A Texas manufacturer of concrete products:

"We feel that we are not familiar enough with such provisions to venture an opinion. We do feel that our Texas Unemployment Compensation Regulations are harsh, particularly on small employers, and that there are numerous injustices in the way in which they are administered. It has resulted in our limiting our employes to a minimum number, and refusing to hire extra employes during times when we could have used them because we felt that we would be penalized by so doing.

"We do not feel that small concerns should be asked to provide pensions for employes. In our case, we pay our employes considerably more than salaries generally prevailing in this particular area, and feel that they should be able to set aside some of it for the future. We feel that if we are to provide pensions for them, that they, in return, should contribute toward a pension for us. With the present tax-burden that small business is called upon to bear, we do not feel that pensions could be provided without working undue hardships on small employers, and perhaps contributing to the liquidation of numerous small firms who are earning all too little on their present investments under existing conditions. In short, we feel that any such legislation is a step more dangerously near to a Socialistic government toward which our government seems to be trending in greater degree as time goes on."

An Ohio producer of crushed limestone:

"Very little can be done in the rock products industry to stabilize employment on a year-round basis. Most operators now undertake their repairs and much of their capital improvements during the winter season, thereby equalizing employment. In the northern areas the same conditions that restrict construction activities in the winter similarly serve to make production of aggregates in the winter inefficient and unprofitable.

"Any statement as to the effective way of meeting pension demands would only be a guess since actuarial tables and methods for meeting those costs have not yet been developed. It seems however, that cooperation through insurance company agency plans might best serve the smaller concerns. There is much talk about and some few contracts that have allowed pensions with a credit against such monthly pension being taken through Social Security or Old Age Benefits. I do not believe the unions will in the last analysis accept government payments to replace company pensions. Once the government provides a pension or old age benefits for all workers or all persons, the unions will demand further industry pensions as a part of their campaign for a greater share from industrial activity."

This cartoon from the Indianapolis Star expresses the feelings of the rock products industry

A Wisconsin producer of crushed stone and agricultural limestone:

"More steady employment in a stationary crushed stone plant in Wisconsin is impossible. When the snow comes you cannot screen your product and, even if you could, the demand is such that you can produce plenty in the summer time to last all winter. Even if you had a notion to build up large stockpiles, the present tax law is directly opposed to it. If we had a winter of light snow we would not stockpile because on May 1 we are taxed on all crushed stone in stock as personal property at our present rate of $3.72 per hundred, which, on stone selling at $1.00 per ton, is quite an item. Perhaps something could be done if the unions would think in terms of year-around employment instead of the idea of high pay when there is work and layoffs when there is not. Even though a little plant such as ours could not do much in the winter, if the wage structure was changed we could contribute something toward the cause of steady income if not steady employment.

"I mean that if we could get rid of the time-and-one-half for over eight hours per day or 40 hours per week, even if the base scale is a little higher, we would have a definite stable cost on our material. Our men could work longer hours during the summer months and earn enough to tide them over during the tough months of the winter if we couldn't work. We did this years ago. At present, we are required to set up a price on stone for the entire season. This is based on an 8-hr. day at regular wages. The jump from regular scale to time-and-one-half raises our cost to such a point that we cannot sell on the same basis after five o'clock as we could during the day. The result is that we cannot accept any more business than we can fill in 40 hr. per week. Any additional would not only be a loss on that additional business but would impose a loss on what we did during the regular hours."

A Kentucky crushed stone producer:

(Continued on page 168)

HIGHLIGHTS OF OPERATING DEVELOPMENTS

Drilling in a large underground limestone mine features the use of a large jumbo mounted on crawler treads to give the unit extreme portability. The jumbo supports drills from three levels. In this same mine, three drilling platforms carry 4, 5 and 6 drills respectively. In some sections of the mine arms on the columns permit drilling a room up to 32 ft. in width and a minimum height of 17 ft. The drills operate wet. Adaptations are used in connection with these jumbos so that stoping can be carried on from the top platform and in some sections of the mine these stopes have been carried up to an additional height of 30 ft.

As the limestone bed is flat and uniform in thickness a systematic round of holes can be drilled using a 63 round blasting pattern. The spotting of the holes for the mine crew is by means of a projection machine that sends a horizontal beam of light onto the face. All the operator needs to do is to spot the starter drill steel at the lighted intersections.

Loading is done with 40 percent semi-gelatin and the entire round is fired at one time with 14 electric delay caps. Generally from 500 to 800 tons of stone are yielded per round. Three "burn" holes are spotted near the center of the drilling pattern and these are not loaded. Their only purpose is to relieve the ground for the other holes that are shot. The holes range from $2\frac{1}{2}$ in. to $3\frac{3}{4}$ in. depending on the type and size of drill mounted on the jumbo.

The Quarrymaster drill manufactured by the Ingersoll-Rand Co. was, during the year 1949, introduced into many quarries in the East and in the Southeast. This is a piston-type, pneumatic drill that strikes up to 200 blows per minute and is designed to drill holes to a depth of 70 ft. and up to 6 in. in dia. The drill assembly is mounted on crawler treads and the equipment includes a compressor in the 650 c.f.m. range that supplies air for the drill, and for blowing the hole.

In the many installations that the editors visited during the past year the cutting edge used has been a tungsten carbide (Carset) bit, but at one operation, in drilling a sandstone, the quarry operator was using short, threaded, Gill bits that after use were sent to the drill manufacturer's plant for re-sharpening. Grinding of the Carset bits at the other operations was standard practice and the operators were getting three sharpenings before there was a loss in gauge. One bit was resharpened up to 18 times, but with loss in gauge. In granite 6 to 8 ft. per hr. were being drilled; whereas with a conventional churn drill the rate was in the $1\frac{1}{2}$ ft. per hr. range.

The Quarrymaster drill is mounted on crawler treads and is a self-propelled unit. It also is provided with four leveling jacks. Over the collar of the holes drilled by the Quarrymaster a dust hood is provided and the cuttings are collected by a small dust collector that is mounted on the rig. The drill stems are hollow and exhaust air from the 4500 lb. piston drill passes through the steel and aids in removing the cuttings. Provisions have been made so that the hole can be blown by-passing the drill.

One of the most spectacular developments of the past year was the introduction of the Jet Piercing method of drilling into the rock products industry. The illustration shows the JPM-2 model developed by the engineering staff of the Linde Air Products Co. drilling a hole for primary blasting at the quarry of the Kingston Trap Rock Co., Kingston, N. J.

The Jet-Piercing technique involves the use of oxygen and a petroleum fuel that are burned in a specially designed burner tip. The system parallels the ordinary oxygen-acetylene flame techniques. In this type of burner a flame velocity up to 2500 feet per second is obtained. The burner tip is kept cool by a water jacket around it and the water then emerges from the end of the burner in the form of a spray and this cooling water is a big factor in the disintegration of the rock, through spalling.

Oxygen is delivered to the quarry as liquid oxygen, where it is vaporized and stored. The drill at Kingston uses from 2000 to 2500 cu. ft. per hr. and drills at the rate of 8 to 25 ft. per hr. Fractures in the rock account for the variation as solid rock can be drilled at the rate of 20 to 25 ft. per hr.

Lighting the oxygen-coal oil flame on the JPM-2 at an eastern trap rock quarry. In the illustration the operators are burning a toe hole to a depth of 20 ft. The unit here burns a hole in the 3- to 5-in. dia. range although the model JPM-1 developed by the Linde Air Products Co. will drill a hole in the 6- to 9-in. dia. range. The burner stem rotates at about 20 r.p.m.

Drilling is accomplished through several factors. Quenching of the rock by the water sprays shown is the most important, although some rocks undergo a physical change at high temperatures, and at the same time, the rock expands up to 19 per cent. Vertical holes can be drilled and holes that have been previously filled with water can be re-drilled without removing the water. The holes vary in diameter and with specially designed burner tips the bottom of the hole (or any part of it) can be reamed out to a much larger diameter so as to accommodate more explosives where needed.

This type of drilling possibly will, in the near future, play an important part in primary drilling operations.

The illustration shows a truck-mounted, Sullivan Hydro-jib drilling in a limestone mine in the Kansas City, Mo., area. This type of pneumatic drilling has found several other uses in the rock products industry and is especially adaptable for secondary drilling of large boulders, or for drilling a "brow" that could otherwise be hazardous. With the jib-mounted assembly, drill steel up to 24 ft. long can be used and with the added length of the jib, the operator is not exposed to an unduly dangerous job. In underground operations no column jack is necessary.

At the mine where this picture was taken, it permits a higher face to be carried more easily than with the conventional column. Limestone has been removed from the stratum so that about 40 acres had been mined out at the time this shot was taken.

Four International, 10-ton capacity trucks are used to haul the rock to the primary crusher and ventilation of the mine is through the various entries to the mine. The plant uses an Allis-Chalmers primary crusher and the screens are Ripl-flo. The mine is part of the operations of the Thompson Crushed Rock Co.

Riprap plays an important part of the operation and the plant producing this has been mechanized. It is one of the few riprap operations where the stone is handled mechanically and continuously.

Excavation

Pictured above is a 4-cu. yd. Sauerman rapid shifting drag scraper in use at the new plant of the Albuquerque Gravel Products Co. The unit currently is handling 150 to 300 t.p.h. The Albuquerque, New Mexico, area has experienced a steady growth during the past several years and the rock products industry has grown with the district. Some emphasis could be put on the development of atomic energy plants in the area.

The lower picture shows an overhead-type mucking machine, air operated, in a Nevada magnesite mine. Incidental power for the mine is supplied by a D-13000 Caterpillar diesel that drives a G. E. generator. The pneumatically-operated mucking machine is widely used in the metal mining sections as it has relatively high capacity and is a rugged piece of equipment. The loading rate depends a lot on the type of rock, size of muck, condition of track and the amount of muck at a given heading. Track conditions are important as the mucking machine moves ahead at each loading cycle and pulls the ore car with it. Bad track conditions can mean costly delays. In some of the western mines, stoped material is dropped to a cross-cut from the haulage level and the material mucked to cars. In this case it is considered to be better practice than chute drawing with its attendant timber costs. Loading rates will vary from 100 cars per 8-hr. shift up to 150 or more. Skill of the operator is important.

The illustration shows a 120-B, Bucyrus-Erie 3½-cu. yd. electric shovel loading strippings at the Naginey quarry of the Bethlehem Steel Co., Naginey, Penn. The operation is quite unusual because 50 or more ft. of siliceous limestone are being stripped, after which the material has to be drilled, blasted, and otherwise handled as hard rock so as to get at the more suitable stone below. Four Euclid trucks are used on the stripping, two 20-ton and two 18-ton capacity units.

The quarry also is one of the few remaining, large capacity producers that uses an electric haulage system in the quarry proper. There three G. E. electric locomotives do the hauling over standard gauge tracks pulling 56-cu. yd. capacity cars. The haulage track parallels the face of the quarry in more or less of a straight line and it is practiced here to make one big shot per year.

Late in May of 1949 the company broke some 800,000 tons of limestone that involved a total of 192 churn drill holes. The holes are about 125 ft. deep and extend 6 ft. below the quarry floor. The American Cyanamid Co. supervised the loading and shooting of this shot. Delay electric caps were used.

Shown here is an effective solution to the problem of minimizing delays in loading stone at a quarry face, in order to get the most out of haulage equipment and to keep the crushing and screening plant uniformly loaded at high rate of production.

The idea consists of using a rubber-tired primary crushing portable unit at the quarry face and is used here at the Carbon, Texas, plant of Iowa Concrete Materials and Construction Co. of Cedar Rapids, Iowa. Two such units are in production at this quarry as a result of the company's successful experience at its commercial operations in the midwest.

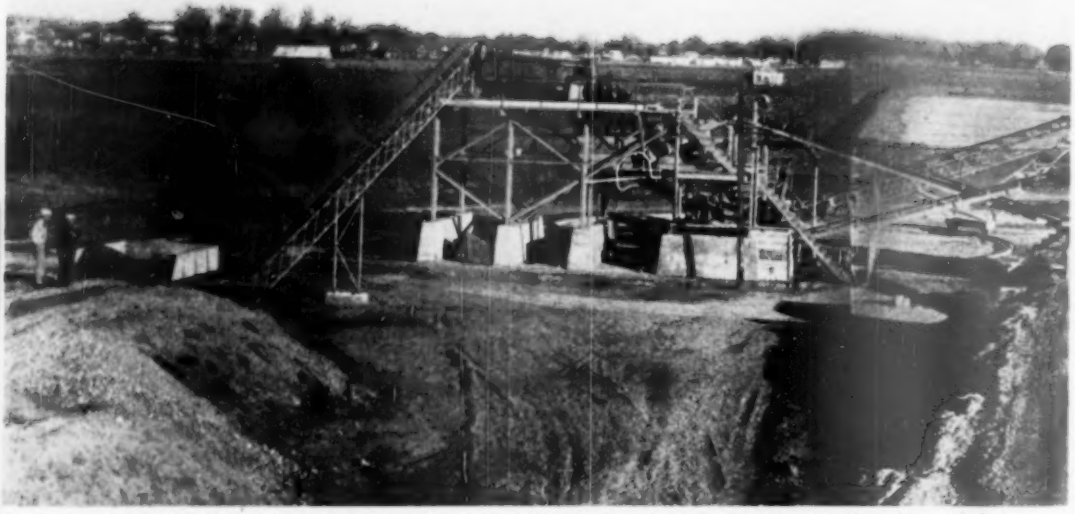
Stone is crushed through 24- x 40-in. Iowa jaw crushers to 7- to 8-in. top size and transferred into the 12-ton truck-loading bin shown, from which a push-button-operated belt conveyor fills the semi-trailer trucks which haul 7½ tons.

Trucks are loaded in 45 seconds and as fast as they are spotted under the inclined conveyor. Each of six trucks is averaging 100 trips a day on a 700-ft. haul and the plant has a continuous supply of stone for production of 400 t.p.h. Two 1½-cu. yd. shovels are used.

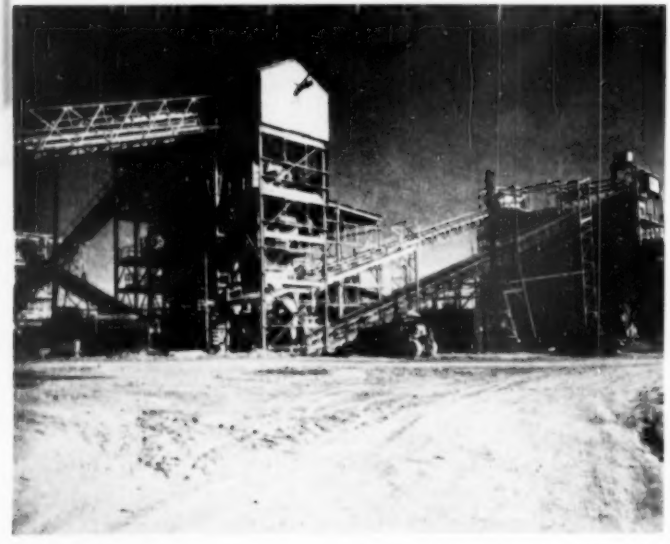
Several new quarries have been opened up in the granite producing sections of the south, mostly in connection with some of the dams being built under the supervision of the United States Corps of Engineers. Often on these large projects, the aggregate producer must take his plant to the job because high freight rates and the large tonnages of rock used make the cost otherwise prohibitive.

The Northwest backhoe shown here is stripping off a top layer of inferior granite at the Clark Hill dam on the Savannah river above Augusta, Ga. The machine is quite adaptable for knocking off a dangerous "brow" on a quarry rim, and it also can gouge out any dirt-filled seams that might be in the upper rock structures.

The Clark Hill dam and its aggregate producing facilities are of particular interest to the rock products industry, for it was found here that the granite sands in the mixer were de-graded to a considerable extent and as a result the F.M. of the sand sent to the concrete batching plant was considerably higher than the specifications called for. Sized stone up to 6-in. is used in the mixer. The sand used is manufactured from the granitic material using a peripherial discharge rod mill in conjunction with a Dorrco bowl classifier.



The gravel processing plant of Hill & Stuart, Inc., Dexter, Mo., is a good example of a very simple plant that can produce either washed, or unwashed sand and gravel. It was designed and built by the E. F. Marsh Engineering Co., St. Louis, Mo. When it is desired to produce washed aggregates, trucks dump to the hopper at extreme left. After scrubbing in the rotary scrubber the sand is removed by a screen and stacked on a radial conveyor stacker belt that is mounted on wheels and operates on a circular track. The gravel is rescreened after the sand has been removed and oversize is returned to the crusher. Material passing through the center screen is carried on a long tubular frame conveyor to a third screen on top of the steel hoppers. The screen operates wet. In processing the unwashed gravel, the center loading hopper is



The illustration in the foreground shows the new crushing plant of the Irwindale operation of the Consolidated Rock Products Co. which serves a large section in southern California. The steel structure contains four Symons cone crushers, the larger one being a 7-ft. unit. The four crushers are mounted in a single row and a high capacity electric crane spans them to facilitate repairs. Tyrock screens are used in the scalping and secondary screening section of the plant.

The older final screening and washing plant is at the extreme right and is served by two parallel belt conveyors. The operation is one of the largest in the West and field conveyors are used to deliver to a surge pile ahead of the new crushing plant. One pit, formerly operated near Irwindale, was re-opened about a year ago and one of the longest belt conveyor systems in the West is used to deliver sand and gravel to the surge pile.

One of the belts in this newer transportation system was 2264 ft. long, center to center. The installation was supplied co-operatively by the B. F. Goodrich Rubber Co. of Akron, Ohio and the Conveyor Co. of Los Angeles. It has been in successful operation for over a year and can deliver up to 1000 t.p.h. at 550 f.p.m. belt speed. The long belt is driven by a 200-hp. G. E. slip-ring motor. The belt is 36-in. wide and was supplied in five sections which were vulcanized on the job into a single belt 4717 ft. long.

used. The pit-run passes through the screen in the center, and then up the longer conveyor to the screen over the bins. The wash water from the scrubber is pumped to the tailing pond (or reject settling basin) shown in the background. There a dike has been thrown up to retain the slush. The plant is said to have sufficient capacity to easily take care of the needs of the surrounding area. This type of plant appears to have many features that would class it as a semi-portable one as the tubular construction features of the Marsh conveyors lend themselves to a high salvage, or re-use value and it is our impression that plants of the future will be closer spaced, of medium to low capacity, that can be moved to the job if need be. The idea of being able to produce dry or washed material in a small plant is novel.

The plant shown is that of the Cheney Gravel Co., near Holt, Michigan and supplies some of the aggregate needs of the capital city, Lansing. The plant features a General Motors diesel generating set, model 6043C, which furnishes power for 13 individual motors including that on the jaw crusher. The plant was supplied by the Austin-Western Co. and one rather unusual feature is that no bins are used.

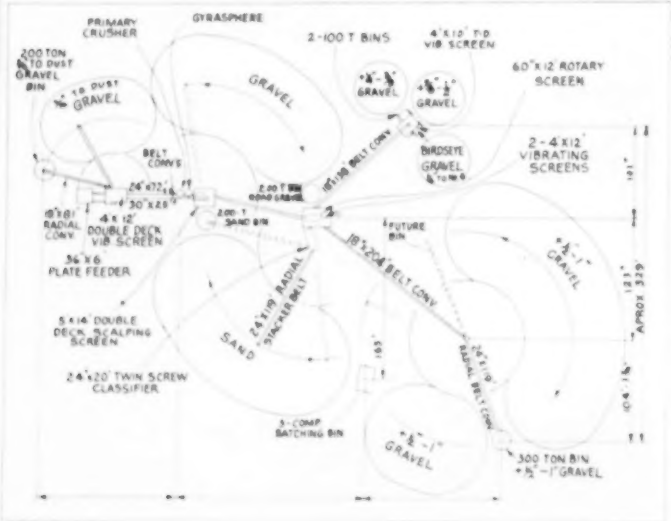
All of the plant's output is stacked by radial stacker belts to ground storage with reclaiming by a Lorain crane. It is a simple and efficient layout with a scalper ahead of the jaw crusher, and the throughs going back to the first conveyor belt. The final products are washed and screened and the sand recovered from spiral dewaterers. This is one of the new plants in the area and when this shot was taken a Lorain dragline was unloading direct to the steel hopper serving the first inclined belt in the plant.

This serves well as one example of the many small plants that are operating throughout the country, some of which could be called temporary plants, and others called semi-portable. While of relatively small capacity they can produce specification material at costs that compare favorably with the larger plants, which often have a freight charge that increases the cost of the plant's output to the consumer.

Aggregates Plants

Stockpiling of material for a gravel plant can be done in several ways and in our travels we have seen several operators, notably those in the far West, who carry a considerable stockpile ahead of the primary plant feeder. Where trucks or bottom-dumps are used to supply the plant, this type of haulage equipment can keep operating, building up a stockpile, even when the plant is down for repairs. The illustration shown here is part of the operation owned by George French, Jr., at his plant near Tracy, Calif. The Caterpillar D6 tractor with a No. 65 bulldozer is feeding a plant crusher at the rate of 450 to 500 t.p.d. In the October, 1949, issue of ROCK PRODUCTS, in connection with the Dorena aggregate processing plant, large stockpiles were built up at the primary crusher by a fleet of 27-cu. yd. (struck measure) Peterbilt bottom-dumpers that dump on the run. They keep piling the material there regardless of whether the plant is running or not. However, at all times a D8 tractor and dozer push the material either into the crusher, or back the material back into a pile that often is 15 ft. or more in height. Each of the trucks is powered by a 200-hp. Cummins diesel engine and they are loaded at the pit by a 2-cu. yd., 80-D, Northwest dragline that swings an Electric Steel Foundry (Portland, Ore.) bucket.

Layout of one of the most modern commercial sand and gravel plants to be built in the Chicago area during recent years is shown in the line drawing. This drawing shows the Barbers-Corners sand and gravel plant recently completed by the Elmhurst-Chicago Stone Co., Elmhurst, Ill. The entire plant is push button, electrically operated by one man from a control station located near the center of the plant. The plant uses Telsmith equipment throughout and features the use of Barber-Greene radial stackers for the sand and gravel sizes produced. It will be noted that in several instances the radial stacker can also load truck or batching bins. A 36-in. x 6-ft. plate feeder is situated under the primary hopper. The scalper is a 5- x 14-ft. double-decked, heavy duty, Telsmith vibrating screen. Two crushers are included in the assembly, a 16-B primary breaker and a No. 48 Gyrasphere. The No. 11 gravel is taken out near the crushing operation and this material is ground stored by the first radial stacker. Scrubbing, following the crushing and screening, is accomplished by a 60-in. x 12-ft. Galland-Henning rotary screen that is driven through roller chains and a 25-hp. Falk All-Motor speed reducer. The radial stacker, it will be noted, feeds this rotary scrubber, or the gravel can be stockpiled ahead of it for road gravel. In the scrubbing section the No. 6 gravel is taken to its radial stacker and the material can be piled in two piles with a 3-compartment batching bin between the two piles. The batcher bins also are filled by this same radial stacker. In a similar manner the sand is stockpiled by its radial stacker, or the stacker can load it to a field truck loading hopper. For the final sizing there are four Vibro King screens consisting of one 4- x 12-ft., double-decked screen, and two triple-decker units of the same size and one triple-decked screen, 4 x 10 ft.



One of the long conveyors in the plant serves the stacker for No. 6 gravel and it is an 18-in. by 204-ft. Robins belt conveyor and is driven through a 7½-hp. Falk All-Motor speed reducer. The wide use of these portable type radial stackers makes this plant quite unusual. The three smaller sizes of gravel are prepared by the 4- x 10-ft. triple-decked screen and the materials stockpiled and/or binned near the screening tower.

Portable Plants

The illustration shows a unique installation of a Cedarapids portable plant powered by a G. E. 276-hp. diesel. The plant is operated by B. L. Anderson, in the Brandon, Iowa, district, and includes a 40-in. hammermill. The portable features are accented by having the G.M. diesel mounted on a Ford truck. The plant is said to be producing about 130 t.p.h. of ¾-in. road stone. The plant has operated in 14 different quarries during one season and this was due in a measure to the ability of the operators to disassemble the plant, move all the equipment as far as 35 miles, and re-assemble, all in 10 hr. In the illustration two Limo shovels load direct to the portable plant so that quarry transportation is practically nil. In the areas west of the Mississippi river, where many miles of highway have to be built through sparsely settled sections, road construction costs have to be kept low. The traffic density on some of the major highways is not too large and bituminous roads seem to be in the majority. However, heavy trucks are one of the main users of these trans-desert roads. Black top plants featuring portability as well as aggregate processing plants (also portable) play a considerable part in the construction of these roads. The roads are smooth riding and many who drive over them for the first time are agreeably surprised with the easy riding qualities of the highways.

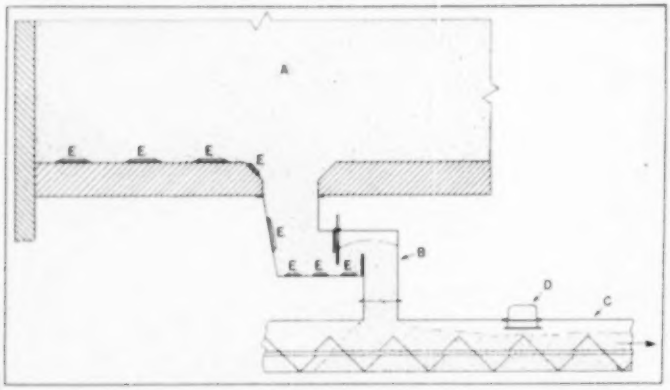
The construction of four and six lane express highways in some sections of the United States has had a considerable effect on the type of plant supplying the aggregate for their construction. The Maine Turnpike demonstrated to many Eastern operators the advantages of taking the plant to the job so as to off-set high freight rates and several faced the issue by purchasing a portable plant with the intention of using it either as a stand-by for their stationary plant, or moving it out onto the job. One even suggested renting his to a contractor if suitable arrangements could be made. In the far western areas portable plants have, for some time, been accepted by the established producers who move them to remote sections of the country processing either sand and gravel, or crushed stone, from deposits that have been previously certified as suitable aggregate sources by the inspecting authorities. The illustration shows the nice installation at the Trap Rock quarry of the John T. Dyer Co. near Birdsboro, Penn. It is a Cedarapids unit. This company is one of the older and well-known producers in Pennsylvania.

During construction of the Main Turnpike completed late in 1947, four portable plants came into the state. Possibly the invasion of the state by the four portables led to the second invasion, for in the last two years there have been sold in the state of Maine alone almost a half million dollars worth of portable plants. One plant, a Pioneer portable, was purchased by a large paper company that owns large areas of timber land. The firm is using the equipment to process its own road gravel. The state of Maine is operating its own portable plant and at the time of inspection it had been used on five different jobs. As the state of Maine has a lot of highways that pass through areas that are for the most part thinly populated, the crew of this portable slept in tents, or otherwise were on their own.

The operation of H. E. Sargent, Inc. in Maine is possibly the largest in the area and it is in use at a quarry. It is a Pioneer plant and features a triple roll crusher. Two of the rolls have corrugated faces and when they run meshed they are said to be excellent for crushing flats and elongated particles. The primary crusher is driven by a Murphy diesel and the triple roll crusher by a D-13000 Caterpillar diesel. J. R. Cianchette has a Diamond plant in the area.

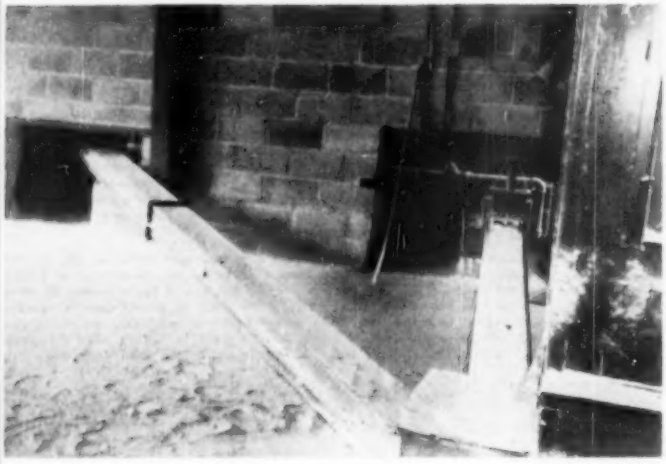
Conveying

One of the most intriguing developments of many years has been the application of air-activated gravity conveyors and feeders for the movement of pulverized raw materials and finished materials in the manufacture of portland cement. The Fuller-Huron Airslide and Airfeeder, as the conveyor and feeder have been designated, respectively, were developed originally by Huron Portland Cement Co. and are now manufactured by Fuller Co. The principle consists basically of changing the angle of repose of materials by their complete aeration and resulting transformation to a fluid state. The airslide actually is made of sheet metal, rectangular in vertical section, and of desired length for a specific application. An upper housing is separated from the air duct section by a porous fabric through which low pressure air is introduced to fluidize and cause material to flow by gravity on the surface of the fabric (See Rock Products, August, 1949, p. 115).



Successful use has been demonstrated in transport of grinding mill discharge, air separator rejects, kiln feed materials, etc., with great economies in power and maintenance.

Shown here is a fully automatic feeding and conveying arrangement. An airfeeder "B" delivers material to screw conveyor "C" from flat-bottom silo "A." Units "E" are aerator units and "D" is a level control device which actuates the solenoid valve to supply or cut off air according to level of material in screw box.



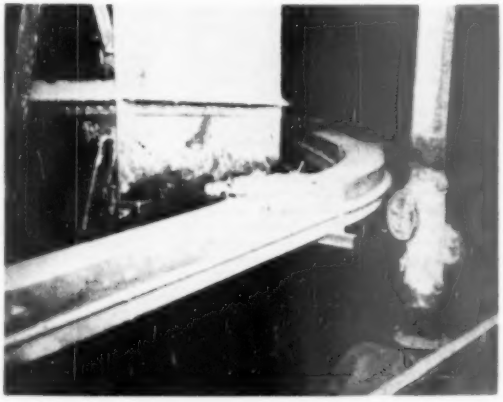
The illustration shows two airslide conveyors delivering hydrated lime from silos to the boot of a bucket elevator at the hydrating plant of the G. and W. H. Corson Inc., Plymouth Meeting, Penn. These probably are the first airslides to be used in the lime industry anywhere in the world. In the August and September, 1949, issues of Rock Products airslide installations at the Alpena cement plant, and at the Pennsylvania-Dixie Cement Corp. plant at Bath, Penn., in the Lehigh Valley were described.

The airslide is sloped about four degrees. Low pressure air is admitted under the porous diaphragm. This aerates the fine material to be conveyed and, as a result, the material assumes the characteristics of water and flows to its destination. A 10-hp. turbo-blower delivering 400 c.f.m. at not over 48 ounces pressure is ample for an airslide of considerable length. It is economical to install, takes up less room than screw conveyors of similar capacity and the up-keep is said to be negligible. The airslides are being used in bulk portland cement plants, across bottoms of silos so that the silos can be emptied under considerable head, and on some trucks. They are said to be practically dustless.

Illustrated here is the use of an airslide in the finish grinding department of Huron Portland Cement Co., Alpena, Mich., selected to illustrate the facility with which obstructions can be avoided in congested areas when conveying materials without use of mechanical methods. In this installation, finished cement is being conveyed, but the conveyor is applicable to the handling of raw materials, rejects and other pulverized materials. At Alpena, these conveyors, and feeders, also actuated by air, are transporting grinding mill discharge, air separator rejects, kiln feed materials, collector dust, finished cement, and are used in the distribution of materials into bins and in withdrawal from bins, hoppers and steamship cargo hold.

The only limiting condition in transporting pulverized materials is that an angle between 4 and 6.5 deg. from the horizontal is required (dependent on the material) for gravity flow after the material has been air-agitated. Velocities range from 800 to 1200 f.p.m. in carrying beds of material ranging in thickness from 1 to 6 in. Maximum volume thus far transported by airslides, at Alpena, is 225 t.p.h. of kiln feed material conveyed by a 14-in. wide conveyor 150 ft. in length. The conveyors operate without noise or dust and require only a blower to deliver low pressure air into the chamber below the fabric on which the material flows by gravity.

Power consumption is low and standardized replacement sections may be installed quickly. The airslide lends itself to automatic operation (See Rock Products, August, 1949, p. 115.)



The illustration shows the pendulum field conveyor at the Roscoe pit of Consolidated Rock Products Co. in the Los Angeles, Calif., area. It is 130 ft. long and carries a 60-in. belt. It was built by the Conveyor Co. of Los Angeles. The purpose of the pendulum is built around the theme of portability.

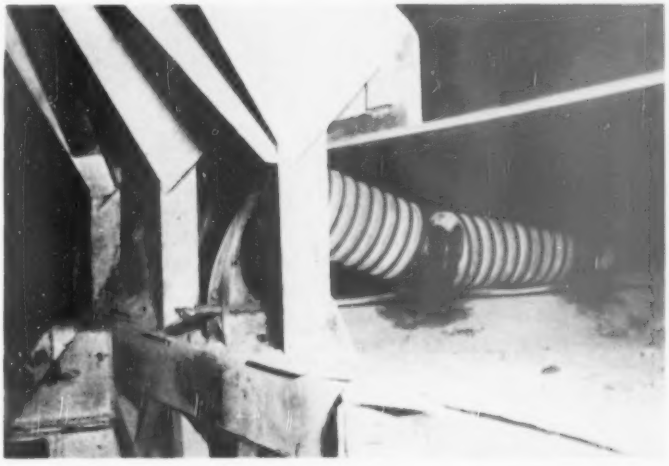
At the right is a 36- x 42-in. Buchanan jaw crusher mounted in a steel structure that rides on a wide-spaced industrial track so that the assembly can be moved. Offbearing from the crusher is a series of 42-in. field conveyor belts. At the extreme left is a cylindrical hopper with a grizzly over it and a reciprocating pan feeder at its outlet. The 120-B Bucyrus-Erie shovel loads the sand and gravel to the cylindrical hopper.

As the face of the pit advances, the shovel "toes" the pendulum around in an arc of about 225 deg. This enables a swath to be cut that is roughly 400 ft. wide. The Roscoe shovel has a capacity of 750 t.p.h. Pendulum conveyors and the mounting of the primary crusher in the pit has for some time been standard practice in southern California and the practicability has been demonstrated by its long use. The field conveyors at Roscoe deliver to a surge pile.

Inter-plant conveying is fairly well established and commonly features the use of belt conveyors. Most of the new plants use belt conveyors entirely and not bucket elevators, except for transporting very fine materials and for certain other miscellaneous uses. Developments in belt conveyors have been along the lines of better and stronger belts aiming at belts of four-ply construction that will have the strength of six- or even eight-ply units.

At the right is shown an improvement at an installation at a new trap rock plant where the Continental Gin Co.'s rubber disc impact idler is in service. This is mounted under the lip of the Syntron electrical vibrating feeder, which feeder is located under the surge pile following the 48-in. Traylor gyratory primary crusher. The purpose of the rubber disc impact idler is to absorb the shock of the minus 8-in. trap rock (a very hard material) and thus protect the wearing surface of the B. F. Goodrich Co. belt being used there. Protecting the surface of the belt will in turn protect the main carcass of the conveyor unit.

A second installation of the disc impact idler is under the receiving end of the inclined rubber belt serving the coarse aggregate screening section in the same plant.



Hungry Horse Dam, now under construction in Montana under the supervision of the United States Bureau of Reclamation, has received considerable attention, especially from concrete technologists, during the past year because it is one of the largest dams using fly ash as a replacement for portland cement. According to reports the fly ash is being shipped from the Chicago, Ill., area and its use is said to be developing a highly suitable concrete at a considerable savings to tax payers. Illustrated left is a Link-Belt conveyor installation at Hungry Horse dam with a L-B tripper and wing conveyor on the stockpiling end of the aggregate processing plant. The belt is 30 in. wide, 850 ft. long and operates at 500 f.p.m. The job is using a total length of some 14,000 ft. of rubber conveyor belting that is from 18 in. to 42 in. wide. Link-Belt supplied this job with over 150 tons of idlers, terminal machinery, and drives. The tripper is of considerable interest as it is mounted on widely spaced industrial rails and carries with it the cross stacker belt. The dam is being built by General-Shea-Morrison Co., contractors, and will be completed in 1953. Hungry Horse dam is one of several dams under construction on the Missouri river and its tributaries, and will be mostly of concrete construction.

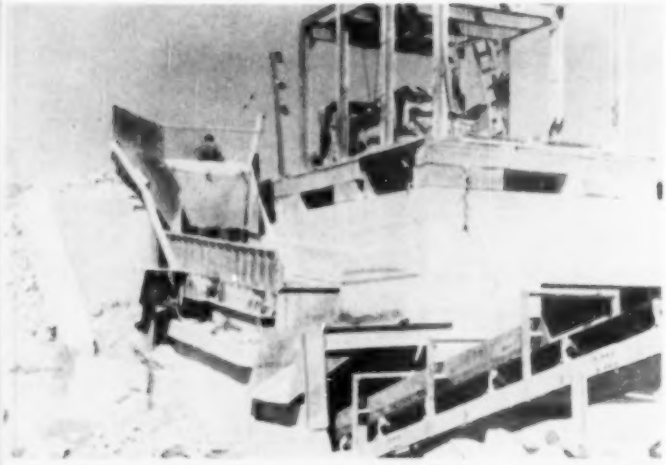
The fly ash is said to cost about one-half of the price paid for portland cement and enable the constructors to use 3-bag mixes or less and still obtain workability superior to 4-bag concrete without air entrainment. Thirty percent of the portland cement may be replaced by the fly ash. The subject of replacements for portland cement in concrete was discussed in considerable detail in the December, 1949, issue of Rock Products as a part of the A.S.T.M. meeting in San Francisco.

Screening

The new sand and gravel plant of the Albuquerque Gravel Products Co. at Albuquerque, N. M., might well be used to illustrate a trend towards mounting screening assemblies over ground storage piles. The illustration shows a modern and neatly arranged plant that went into production this year, and which will serve an area gaining national recognition as one of the three sections of the United States where the development of atomic energy is being carried forward.

In the June, 1949, issue of Rock Products an installation in the crushed granite field that used this same method of mounting the screening plant was described in detail. The plant referred to is operated by Tyrone Rock Products Co., and is a new plant located south of Atlanta, Ga. It is an operation designed to help serve the needs of the area. Reclaiming is accomplished easily in this type of plant and at the Tyrone operation provisions were being made to return some of the larger sizes to the crushing plant for re-crushing and screening.

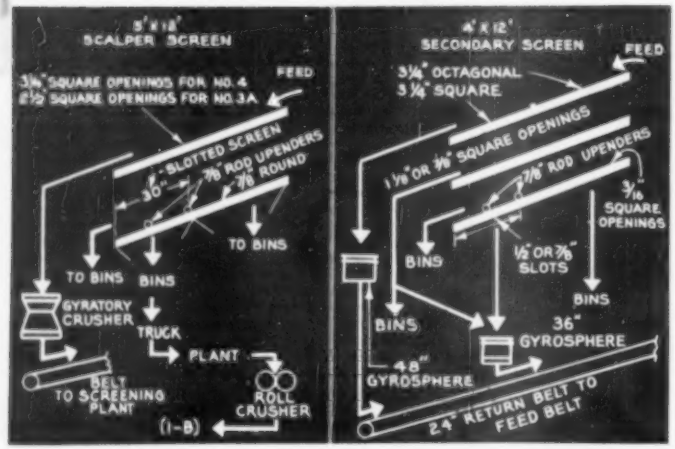
In such an installation, if one size of stone predominates it is easy to push back some of the excess rock with a tractor and dozer.



At left is shown one of the few plants in the United States that is completely mechanized for the production of riprap. The screen is a 5- x 14-ft. Simplicity riprap screen. The upper end has 5-in. square openings and the lower section 14-in. square openings. The unit follows a 30-in. Allis-Chalmers Superior-McCully gyratory. This type of screen was installed in the new plant when the company was granted a large riprap contract for a flood control project on the Missouri and Kansas rivers.

Specifications for the riprap required that 100 percent of the pieces weigh less than 150 lb., that 80 to 100 percent weigh less than 100 lb., that 25 to 55 percent be less than 25 lb., and that 0 to 5 percent be less than 5 lb. The aggregate passing through the riprap screen is processed for commercial stone. The installation briefly described is that of the Thompson Crushed Rock Co., Kansas City, Kan.

In the August, 1949, issue of Rock Products a description was given of how a southern operator prepared riprap in approximately the same size range by an ingenious grizzly assembly that preceded the secondary crusher.



In the December, 1949, issue there was described in detail a plant in northeastern Pennsylvania that possibly accomplished the ultimate in screening by making alterations in the cloth used on the vibrating screens so as to sort out, and remove, flat and elongated particles. The system, as shown in drawing, left, consisted essentially of having some sections of the screen's deck made of slotted wire and/or slotted steel plate.

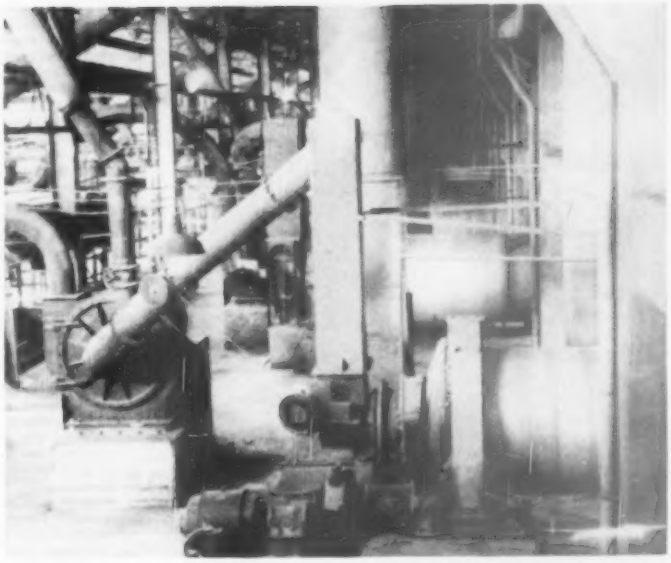
The slots were at right angles to the long axis of the screen. At the upper edge of these slotted sections, and clear across the screen, a $\frac{7}{16}$-in. steel rod was welded. As the crushed material came down the screen cloth, the flats would crawl up (and over) these steel rods. This put the flats, so to speak, on end and once up-ended they would slide through the slotted openings. The flats were caught in a separate bin and sent to crushing equipment that would reduce it to the finer sizes as it was observed that most of the flats were in the larger and intermediate sizes.

The material was a sandstone and was being processed at the new plant of the Wayne Concrete and Sand Works.

A comparatively recent development in direct-firing of rotary cement kilns is this application of compartment mills at the Montreal East plant of Canada Cement Co., Ltd. Each mill fires a single kiln, and they are three-compartment units. The first compartment, which is 5 ft. long, (the mills measure 25 ft. 4 7/8 in. between centers of trunnion bearings) is strictly a drying chamber and grinding is done by 2-in. grinding balls in the second compartment and by 1 1/2-in. balls in the third compartment. Radial lifters are the means of transfer between compartments.

High moisture content coals that necessitate the introduction of high temperature air in great quantities were one of the factors in selection of compartment mills. This type of mill is said to lend itself to the use of approximately 20 percent primary air and has the advantage of permitting air as hot as 600 deg. F. or more to be passed through in the drying of wet coal. In the case of a 430-ft. kiln, fired with a short, hot flame, hot air is admitted into the coal mill at 600 deg. F. in drying coal with up to 12 percent moisture.

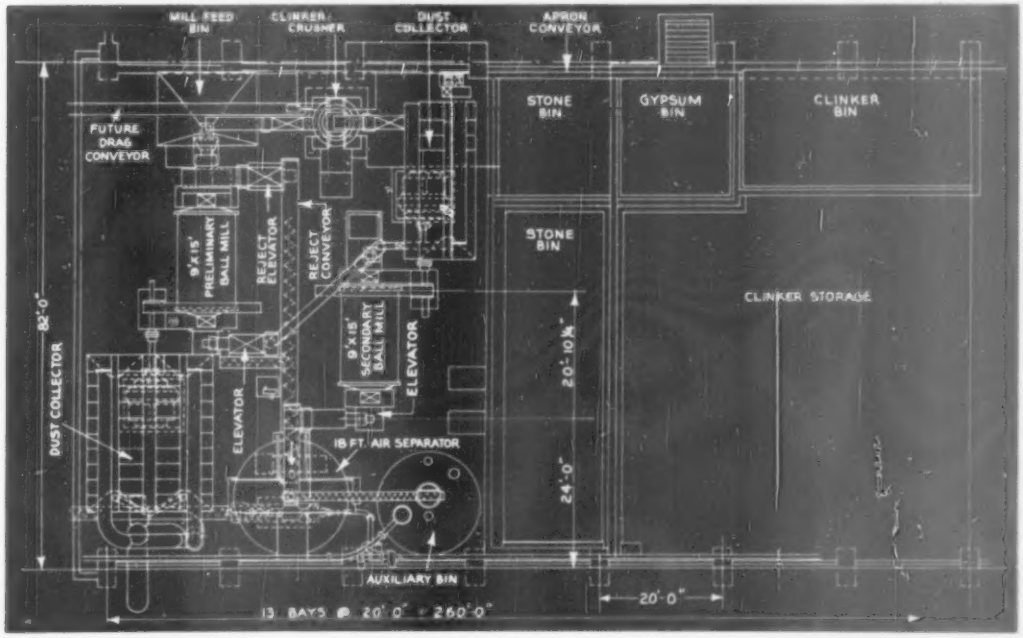
Each mill in this plant grinds coal to 90 percent minus 100 mesh at the rate of approximately 5 t.p.h. with a grinding media consumption of less than 1/4 lb. per ton of coal pulverized and a power consumption of about 25 kw. h. per ton of pulverized coal. (Refer to the August, 1949, issue of Rock Products, p. 127, for further details).



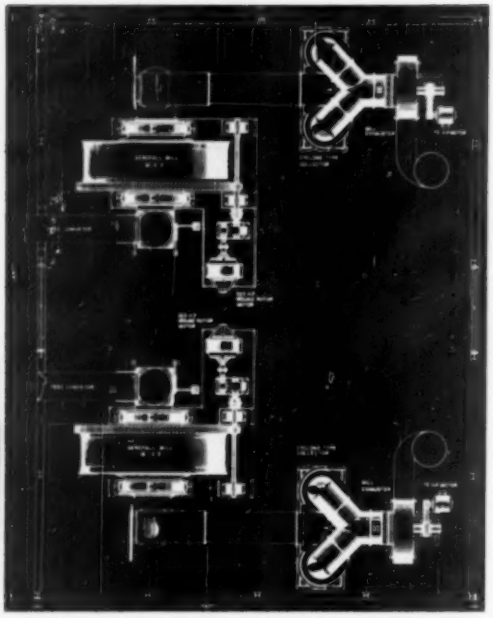
The new clinker grinding mill of Louisville Cement Co., Speed, Ind., is representative of modern two-stage grinding practice with air-swept ball mills. It has a high degree of flexibility for grinding with various circuits and circulating loads, and consists essentially of two Allis-Chalmers 9- x 15-ft., ball mills, an 18-ft. Raymond mechanical air separator and Norblo dust collectors. Clinker is first crushed to 1/2-in. top size.

The preliminary mill output is secondary mill feed and discharge from the latter mill is put through the air separator with rejects returned to the preliminary mill, in the circuit employed when the plant was visited by the editors. With this circuit and an approximate circulating load of 300 percent, 145 bbl. of portland cement per hr. were being ground to 1700 Wagner specific surface.

The mill design is such that alternate circuits easily would permit rejects to be routed to the secondary mill or any proportion to either mills. Short mills were selected in order to hold down the generation of heat and thus conserve on power consumption. Both grinding mills are air-swept and air is bled in through the air separator by one of the dust collectors, resulting in low temperature rise in the mills. Clinker as fed to the circuit at 185 deg. F. is ground into cement at about 225 deg. F. It is expected that power utilization, including that for the clinker crusher, would be close to 9 kw. h. per bbl. of cement ground.



Grinding



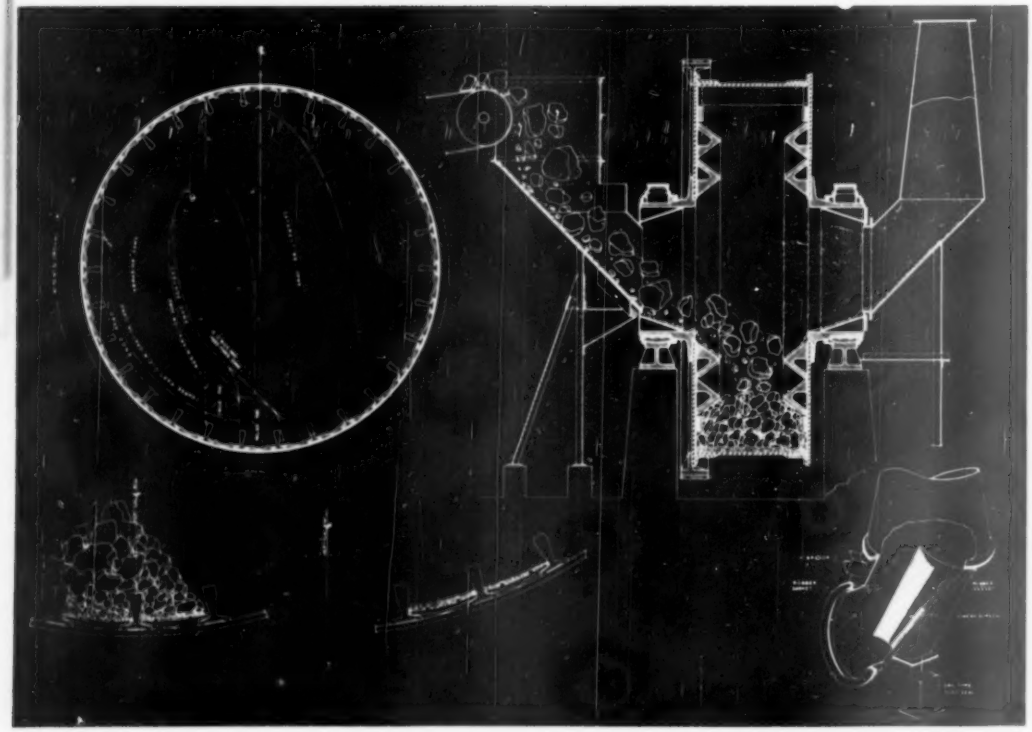
The two line drawings on this page show the principle of the Aerofall mill manufactured by Aerofall Mills, Ltd. This type of mill is based on the idea of lifting material and dropping it from a sufficient height to break it by free-fall impact. The mill is a dry, combined crushing grinding unit, capable of taking quarry stone up to 18 in. in dia. and reducing it, if desired, to as fine as 325 mesh in one operation. If a coarser product is desired, 10 mesh is said to be obtainable.

Air classification is employed and the mill will tolerate moisture contents in the 3½- to 4-percent range. By heating the intake air, higher moisture contents may be handled. Some experimental work has been done using steel balls 5-in. in dia. in the mill. The use of tungsten carbide steel balls also was experimented with and these gave a grinding ball of a specific gravity of 14. This had some desirable features. The optimum ball charge is said to be 2.5 percent of the mill's volume. Indicated ball consumption: 0.3 lb. per ton. The mill is said to produce a minimum of slimes.

The manufacturer states that calculated capacities are in the following ranges: for barite, where 99.5 percent is minus 325 mesh, with the 12-ft. dia. mill, the capacity is 115 tons per 24 hr.; with the 25-ft. dia. mill, the capacity is 1150 tons per 24 hr.; and F calcite, 60 percent minus 325 mesh, the 12-ft. mill gave 170 tons and the 25-ft. mill gave 1700 tons. Power requirements are nominal.

In comparing the product from the Aerofall mill with current standard grinding practice, the manufacturer claims that a more uniform grind results and with less oversize in the coarse range, in addition to less sliming. In some of the tests made by the developers of the mill, the raw feed material was crushed to minus 10 in. with a primary jaw crusher. It also is stated that the mill has a high efficiency as a differential grinder and several tests have been cited, one involving grinding a tough limestone with gypsum. It was possible to make a selective grind so the resulting gypsum material was in excess of 85 percent gypsum and the plus 200 mesh showed very little combined particles but was mostly a mechanical mixture of limestone and gypsum.

Flotation was used and this brought the gypsum up to 93 percent. When steel balls were used in the mill the efficiency fell, decreasing rapidly when the balls were approaching the 2½-in. dia. range.

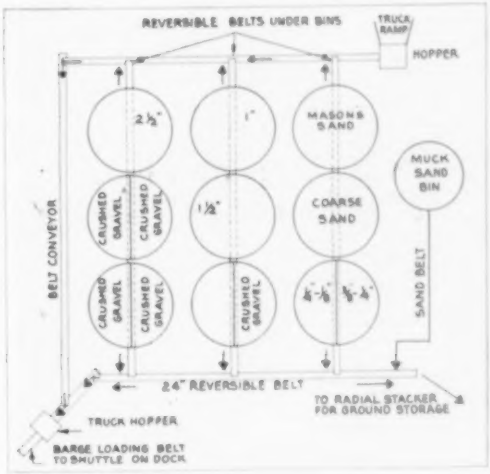


Sand Classification

For those desiring a storage system with extreme flexibility, the line drawing showing the method used by the Pacific Building Materials Co. should be of interest. It will be noted that the nine main storage silos (the plant is built over them) have reversible reclaiming belts under them. These can blend material to a belt system that serves river barges, or to a modern ready-mixed concrete plant nearby (not indicated on the drawing). The reclaiming belts also can feed a main header belt that is reversible, so that any, or a blend, of the materials can be sent to a radial stacker, mounted on a circular track, for ground storage. This same header belt can be reversed and deliver to the barges.

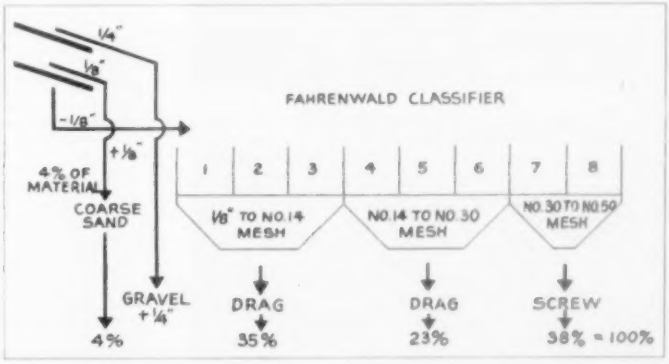
At two different locations on this system are spotted convenient truck hoppers so that stockpiled materials can be shipped, re-blended, or used in the batching plant. A second feature of interest to many eastern producers is the method of removing water-logged wood chips from the river-dredged gravel. A Soco scalper makes a preliminary sizing and some of these sizes go to individual drags that resemble ordinary sand drags except enough turbulence is provided in them to lift out and remove the wood chips.

The bins all are cylindrical and are 16 x 16 ft. Five of them are "splits," with a division wall making them two-compartment units. All of the belts involved were spliced on the job using vulcanizing equipment. The splices cost about one dollar per inch. The radial stacker has a clear fall of 60 ft. for the material and it can be swung in an arc of 180 deg. In addition to the ground storage facilities, barges often are used as floating storage, especially for the masons and concrete sands.



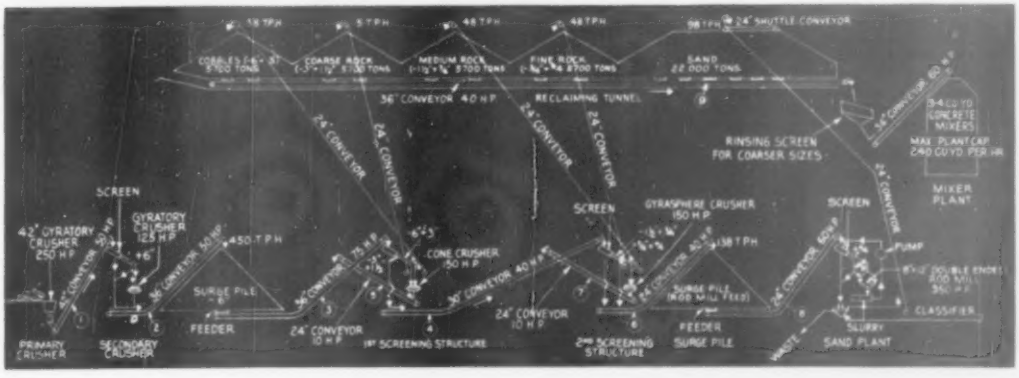
The line drawing indicates how a producer in the Northwest prepared four sizes of sand. The first and coarser sand, it will be noted, was a screened product. The other three sizes were a blend prepared by blending the spigot products from the EX-8, Dorrco sand sizers. This installation was described in detail in the October, 1948, issue of Rock Products and is of continued interest because equipment of this type can deliver, if desired, up to eight sizes of sand.

At this Portland, Ore., plant two of the sizers were in use making a total of 16 spigot products, so theoretically, at least, it would be possible to produce 16 different sands from the one installation and do it continuously and with a minimum of operational attention as the units function through Pressurtrol regulators supplied by the Minneapolis-Honeywell Regulator Co. of Minneapolis, Minn. The sizers are preceded by a Dorrco, 20-ft. hydroseparator.



Sand classification procedures at the many big government dams inspected recently indicate that all of these projects make one size of sand; however, various methods are used for storing and for draining this sand. At Dorena, in Oregon several stockpiles were built up by trucks. The base of the drainage area was made up of about 6 ft. of cobbles and the excess water drained through this porous bed. At Camp Hill (Georgia) four piles were used as indicated in the accompanying line drawing. One was being built up while the second was being drawn from. Two were draining.

At Bugg's Island (Virginia), there is a large storage pile of sand at the processing plant, and a second at the damsite about three miles away so that inter-operation handling permits satisfactory drainage. Similarly, at Davis dam in Colorado, sand from the plant's storage pile is trucked to the damsite with suitable drainage in transit. Mt. Morris dam (New York) uses two large sand piles. One drains while the other is in use, with a reclaiming tunnel under both. At Dorena dam a Hardinge mill manufactured a part of the sand used. At Bugg's Island, Camp Hill, and Mt. Morris, all three used peripheral discharge Marcy rod mills in conjunction with Dorrco bowl-rake classifiers.



Manufactured Sand

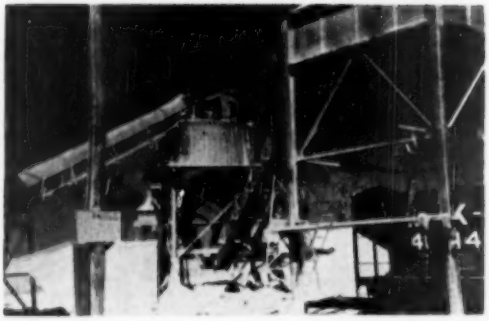
The manufacture of sand has been carried on in the West for several years. One of the first such installations was at the aggregate plant supplying material for Shasta dam (Kennett, Calif.). Later two companies in California manufactured concrete sand from excess material (pea gravel) using rod mills and a third there used a Symons impact mill.

With the development of the idea of using fine aggregate that has the same expansion properties as the coarse, it became necessary in many cases, to manufacture sand from the coarse aggregate itself so the practice has been to take any of the unwanted sizes that the processing plant produces and reduce them to sand. At Dorena dam in Oregon a Hardinge conical ball mill prepares a part of the needs. Three other dams being built under the supervision of the United States Corps of Engineers are using Marcy rod mills and are using, as the raw material, minus ¼-in. screenings along with some coarser sizes that can be bled into the feed materials. At a dam in Texas hammermills are used entirely for its sand needs.

Several eastern producers have expressed interest in manufacturing sand from excess plant materials. In one case, the pit-run was deficient in minus 100-mesh material and had a surplus of pea gravel so it was proposed to grind the pea size and add to the mix.

Near Lancaster, Penn., this New Holland 40-40 impact pulverizer, upper left, went into operation as the primary breaker. The plant produces a manufactured sand as its only product and this material is processed from a semi-consolidated sandstone. In the pit a Lima shovel using an Electric Steel Foundry Co. bucket, loads to Koehring Dumptors and in the illustration one of these trucks is dumping to a reciprocating feeder ahead of the impact breaker. The belt conveyor in the foreground returns any oversize from the scalping screen back to the pulverizer. This machine is driven by two 75-hp. Allis-Chalmers motors and the crusher is a smooth, quiet running piece of equipment.

Disintegration of the material is accomplished by relatively high speed impactors in conjunction with breaker bars. At this installation very little oversize gets back to the primary crusher. The sand is washed in a battery of Telsmith spirals in conjunction with a drag.



Mechanical air separators like the one shown left are gaining widespread application in the production of manufactured sand by the dry process. The movement started and has gained momentum in plants designed to produce aggregates for some of the large government projects being built, but established aggregates producers, particularly in the East, are planning installations of similar equipment.

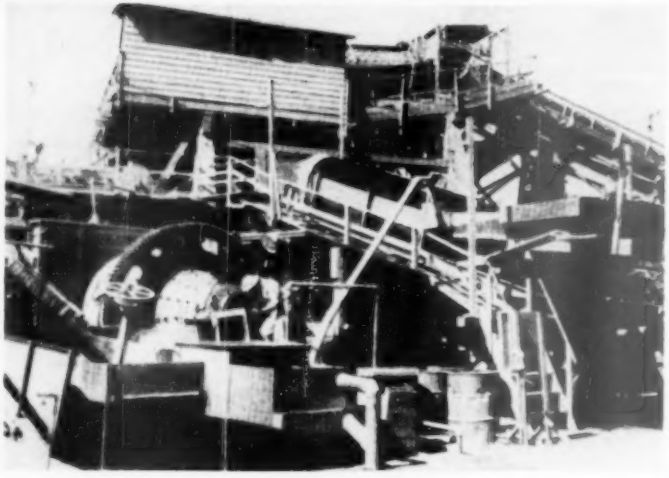
The air separator is identical to those used for closed circuit grinding in the portland cement industry—the only difference being that the fines comprise the rejects while the "rejects" are the fraction desired for incorporation into the manufactured sand. The air separator skims off the excess 100-mesh fines and is adjustable to produce a uniform product.

In the installation shown here, the belt conveyor on the left is the means of feed of minus 16-mesh fines into the air separator. The inclined belt conveyor in the foreground delivers the sand, from which excess fines have been removed, into a car-loading bin. This sand is proportioned with a coarse fraction (No. 4 to No. 16) at the concrete mixer. Fines are conveyed to a bin visible in back of the air separator, for stockpiling or disposal by truck.

Shown at the right is a Hardinge conical ball mill in use at a large U. S. Army Engineer sponsored dam in the northwest. In the October, 1949, issue of Rock Products was published a detailed description of the aggregate and sand producing plant. It is of particular interest at this time because the technique used there may point the way to an easy, effective and over-all method of correcting the alleged destructive effects in concrete of the "reactive aggregates."

It should be recalled that this type of aggregate, when in small amounts appears to be more destructive than when in larger amounts, hence, if the pit material is sub-grade from this cause, it might be practical to take the same aggregate, reduce it to sand, then put this sand back into the mix, having in mind that a fine material reacts faster than a course. Or, as one engineer put it; "If the reactive aggregate is ground fine and put back in the concrete it uses up the alkali in the cement before the concrete has set."

This is substantially what was being done at the Oregon installation. In the upper right hand part of the illustration are two Wemco spiral classifiers that operate in conjunction with the conical ball mill.

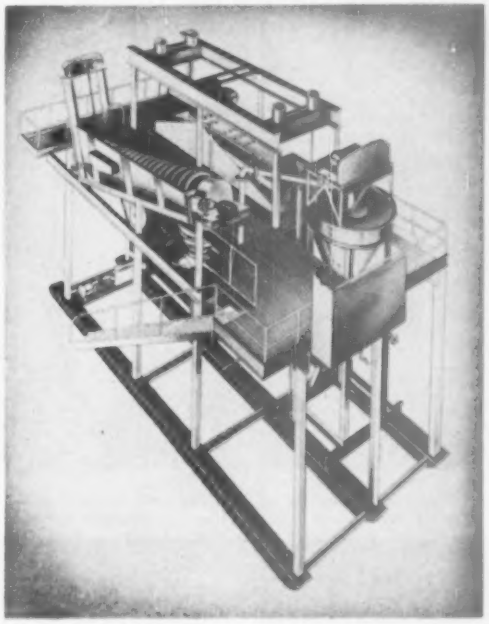


In the May, 1947, and October, 1948, issues of Rock Products, almost three years ago, we publicized the possibilities of using the HMS (Heavy Media Separation) process for the beneficiation of coarse aggregates. As a direct result of this publicity, for the first time in the aggregate field, a commercial plant went into operation to prepare off-grade gravel for concrete near Rivers, Manitoba, Canada. Unfortunately, photographs on hand of this installation are entirely inadequate to show the process to advantage and how simple it is. Therefore, presented here is an artist's conception of one of the types of HMS machines as developed by the Western Machinery Co. of San Francisco and used on the Canadian job.

The above mentioned articles contain operational details. Remarks here are confined to operational results. The Manitoba gravel had 2 to 5 per cent shale in it and the pit run material made unsatisfactory concrete. The nearest suitable gravel was 165 miles away and the freight rate was $2.51 per cu. yd. The HMS process took the inferior material and removed the shale and made an excellent aggregate out of it at an over-all cost of 10c per ton. The patents covering this process are owned by the American Cyanimid Co. and royalties are in the total cost figure given. The shale had a sp. gr. of 2.0 and the usable material, 2.6 although the HMS process will work on differences as little as 0.1 sp. gr. At Rivers the pit run was crushed to minus 2-in. with a Cedar Rapids crusher and the minus 10 mesh screened out as the HMS process is for coarse materials. However, the American Cyanimid Co. has its so-called "Dutch States Cyclone," an adaptation for fine materials.

The 2-in. material is fed to the cone shown in the line drawing where a non-segregating pulp of finely, pre-ground, magnetite in water provided the heavy media. In this liquid of high sp. gr. which has its density controllable within narrow limits, the light portions (shale) floated and the good gravel sank.

The balance of the process involves recovery of the magnetite. The operators report that the Wemco HMS mill has been fool proof, takes one man to run it and that the mill has processed 30 cu. yd. per hr. Its dimensions are 28 ft. long, 14 ft. wide, and 16 ft. high. It is semi-portable. Lost time has been negligible. The Mobile mill operated on as little as 200 gallons of water per yard. The operators further state that "the cost of the process, including royalties, is about equivalent in Manitoba to a truck haul of two miles."



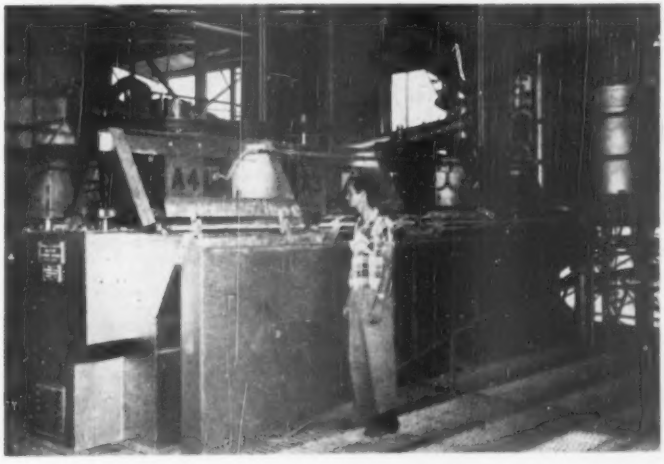
BELOW—LEFT:

Beneficiation by flotation has for some time been considered standard practice in the phosphate industry. The illustration shows a battery of flotation cells in the Davison Chemical Co.'s Pauway plant in the Florida fields. The plant was described in the August, 1949, issue of Rock Products and features the use of an Akins, 66-in. submerged type spiral classifier that probably is the largest of its type in use in the South. Denver Equipment Co. and Minerals Separation Corp. cells are used in this modern flotation plant that is treating debris from previous washing plant operations. The older washing plant uses log washers and two Hardinge conical ball mills for washing the pit-run materials. Froth flotation for treatment of fine-mesh materials, and heavy heavy media separation for particles in the larger size ranges, will play a larger part in flowsheets of processing plants to improve products or enable them to pass specifications.

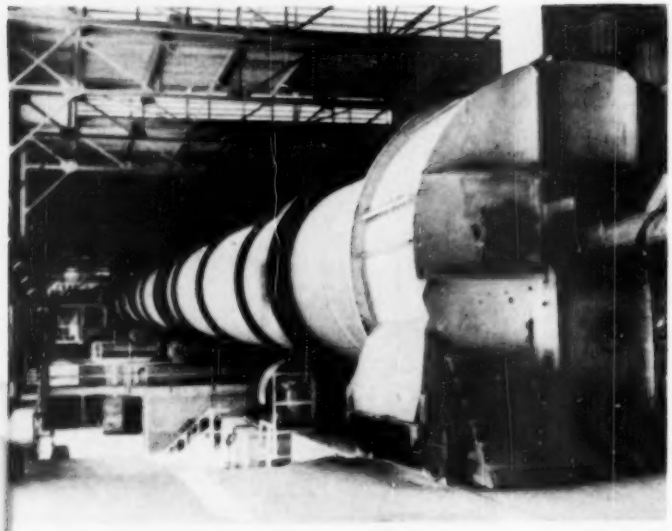
BELOW—RIGHT:

The illustration shows one of several magnetic separators in use in the new slag plant of the American Materials Co. (See May, 1949, issue of Rock Products). The finer sizes of slag are beneficiated by batteries of magnetic separators and the product used by the glass industry as a source material for manufacture of glass containers. The minus 16 mesh can be shipped for agricultural slag or treated on this Magnetic Engineering and Manufacturing Co. high intensity separator.

In the plant are found also type "A" Dings magnetic separators and Eriez permanent Alnico units. In the coarse aggregate production section the material is given a preliminary treatment with a 42-in. Cutler-Hammer stationary type magnet as it comes from the spoils bank. Dings magnetic head pulleys also find use in this section of the plant. Material from the plant is shipped over a wide area adjacent to Cincinnati, Ohio. Some slag is sold for glass wool manufacture.



Calcination

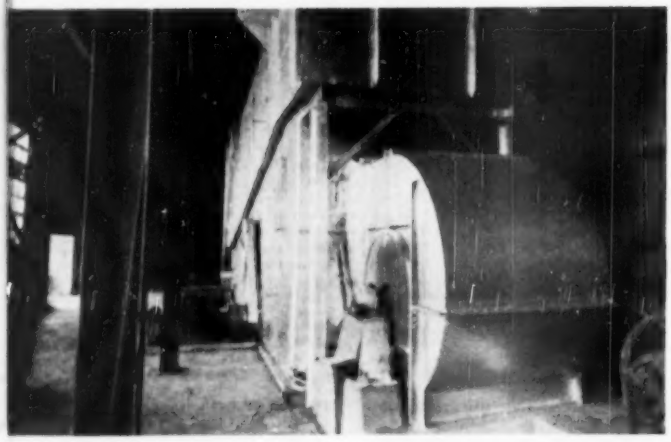


The trend continues to be almost entirely in the direction of longer and larger rotary kilns for portland cement manufacture, due to the high level of fuel costs. This 430-ft. kiln of Canada Cement Co., Ltd., at Montreal, is typical of many wet process installations over the United States.

Operation of kilns today is at higher rates of rotation than the common speeds of less than one r.p.m. of a few years ago. Speeds today are more near 75 r.p.h., on the average, with flatter slopes and thinner beds of material flowing through. It is claimed by proponents of high kiln speeds, as much as 100 r.p.h., that greater heat content is made available to the material, as a result, and that a more uniform rate of production per unit of time is attainable. On the debit side, high stack losses are being experienced.

Fuel savings of 10-20 percent or more, by virtue of long kiln installations, are common. These kilns are sensitive and, as a result, more instrumentation has come into use including oxygen analyzers and thermocouples which are placed at critical locations as a control factor in minimizing mud ring formation and variations in output.

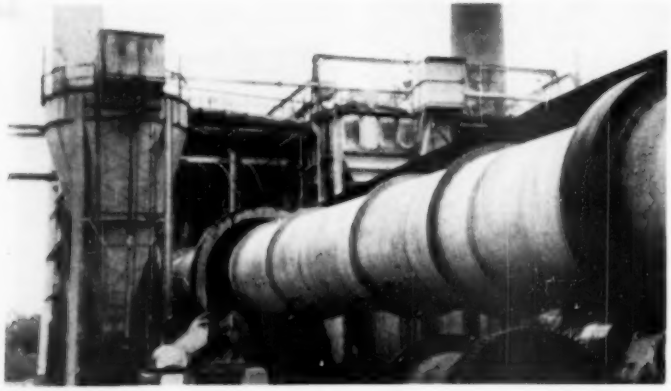
In the particular installation shown here these two devices are used almost to the exclusion of any other instruments to control firing.



Nearly all the newer installations of rotary kilns have air-quenching clinker coolers installed in connection with them. Such coolers enable the chilling of clinker down to room temperature or thereabouts, depending upon clinker size, for immediate handling by conventional equipment into storage or to bins. Air quenching also has the advantages of improving the grinding characteristics of clinker.

A third advantage, and an important one, is that their installation is effective in controlling kiln combustion conditions. The bulk of the combustion air is preheated by having been forced through the hot clinker bed and constitutes all the secondary air.

In the illustration of an inclined grate cooler installation at Alpha Portland Cement Co's. plant near St. Louis, Mo., temperature of the secondary air entering the kiln is positively controlled at 1100 deg. F. Through use of a thermocouple in the air stream just over the clinker bed, the cooler drive automatically speeds up or slows down to compensate for differences in temperature of the air entering the kiln.



Shown here is an installation of a Fuller Airlift constant head feeder to regulate flow of raw material into a dry process 10- x 150-ft. rotary kiln at Louisville Cement Co., Speed, Ind.

Uniformity of feed of fine ground materials into kilns and throughout the manufacturing process has always been difficult to attain, due to bridging and flushing, and is of importance to quality control.

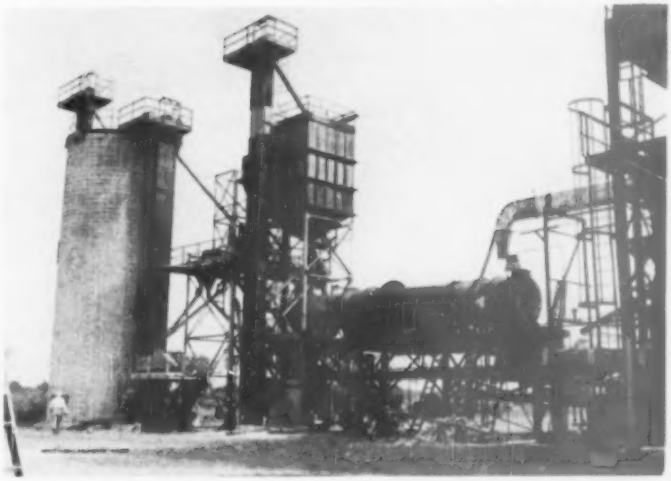
In this device, low air pressure is used to elevate the material from a bin vertically through an air lift pipe into a constant head box within which a screw conveyor is operated with a constant level of material as source of supply. Discharge of the screw conveyor is into the kiln feed spout. With this arrangement, flooding is minimized and there is a proportionate uniformity of bed and flow through the kiln.

Air as a medium of movement for materials has been applied in many other applications in the cement industry this past year.

The most easterly perlite processing plant that was built during the past year is shown in the accompanying illustration. This plant will receive its raw material from newly opened deposits in New Mexico. Intentions are to ship this raw material in open gondolas to the Atlantic Corstal plant where the raw rock will be exfoliated and the finished materials shipped from the new plant.

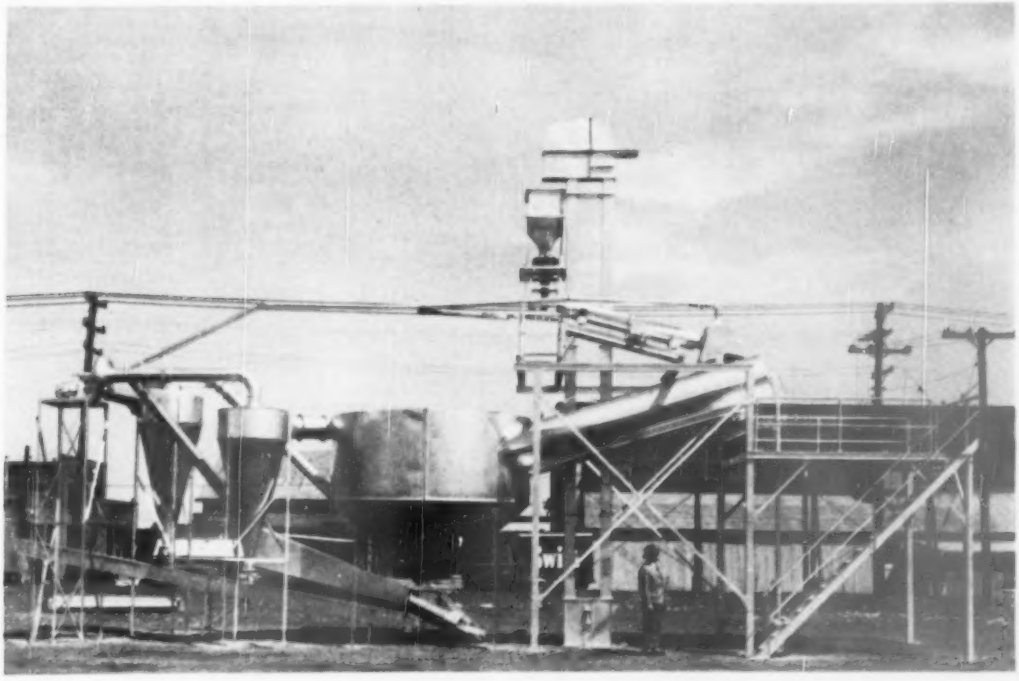
One of the problems already encountered in shipping with only a few processing plants in operation east of the Mississippi river to date, is that some crude perlite remained in the gondolas and later got into foundry and moulding sand being shipped in the same car. When this raw rock came in contact with the molten iron or steel, it exfoliated and seriously damaged the castings.

Some producers of crude perlite ore ship the material wet—as it comes from the classifiers in the grinding plant. This type of sand can hang up behind the false lining of a box car and will not drop out readily until the material is dry, so if the shipper does not use considerable care in unloading, the car may next be used for shipping a rock products material where inclusions of perlite may do much damage.



Perlite, during the past year, assumed a commanding position in the lightweight aggregate field because of its inherent characteristics. It is being accepted in the plastering field because it is an aggregate that has excellent insulation and sound absorption qualities, and because it is so light that a plasterer does not have to use as much physical exertion to carry a standard amount of the mortar, as is the case with the hard aggregate. So far all raw perlite has been found west of the Mississippi river and the crude material, in many instances, is being crushed and sized at the mine, and the product shipped to Eastern markets suitable for exfoliation. Michigan, Missouri, Pennsylvania and New Jersey are a few of the states that have, or are now building exfoliation plants.

The expansion of the crude rock is due to inclusions of water of crystallization. When the rock is heated the material expands from 8 to 17 times its original volume and gives a white and extremely light material. One of the problems of the industry is to prevent formation of excess fines and it is indicated that if the heat is applied too rapidly, the explosion is too violent and an excess amount of fines is made. The illustration shows the Muehlaisen furnace as manufactured by Muehlaisen Perlite Process, Inc., at Ft. Worth, Texas. It will be noted that the rock can be pre-heated if desired so as to drive off some of the water and thus give more of the much to be desired coarser material. The products as expanded are collected in the cyclone collectors as shown below.



Stockpiling

The illustration shows a portable plant in western South Dakota near Sturgis that uses a highway "Maintainer," or motor grader, powered with a Caterpillar diesel for stockpiling. The operation is owned by Gustafson & Reynolds of Sioux Falls, S. D. This plant, incidentally, is about 400 miles from home base. Stockpiles of this kind usually are built up by a truck and then some leveller is used to smooth out the surface. Relatively lightweight rubber-mounted tractors with a dozer blade are used quite extensively for this work. Secondary breakage due to heavy equipment passing over a previously sized material must be considered in a choice of equipment for aiding the stockpiling.

In one Eastern plant a Lull Mfg. Co. transporting unit with 14 x 24 Firestone tires was doing this and similar work about the plant. To give the machine added weight the tires were filled with water. At another operation levelling was being done with a Turnadozer using 21 x 25 Firestone, heavy duty tires.

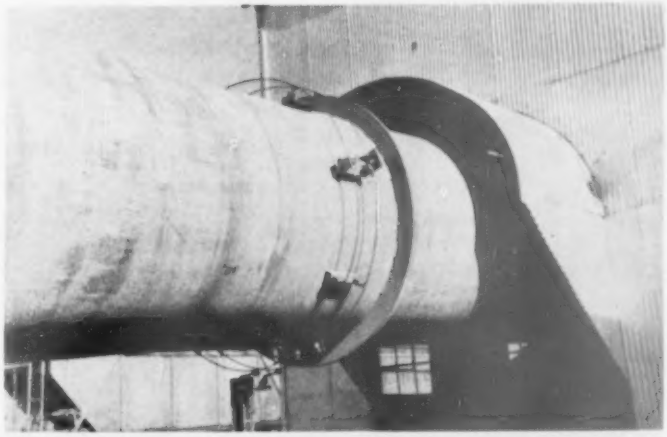
Others in the west stockpile with bottom dump units which have a blade that assists in the levelling operations. Others have used drag scrapers of the Sauerman type for this work. Heavier tractors with crawler treads obviously are used also to a considerable extent for this type of stockpiling.

Stockpiling can be an all-inclusive term. In some operations the raw material is stored ahead of the primary crusher. It is more commonly understood as meaning the storing of the finished materials. Intermediate storage piles, or surge piles, also can be considered as stockpiles. One large operation in California uses several intermediate surge piles of large capacity. The illustration shows the surge pile that follows the primary crusher at the Irwindale plant of the Consolidated Rock Products Co., near Los Angeles, Calif. There, two belt conveyors build up the pile.

The installation at Irwindale features the use of a primary jaw crusher in the pit and a long series of field belt conveyors ahead of the surge pile. Operations ahead of the pile are conducted from two different pits. Surge piles in the rock products industries are fairly well distributed around the United States. One of the most northerly is in north central New Jersey where climatic conditions may be severe. The top size of crushed stone reclaimed from a surge pile is in the 8-in. range although one operator plans on a 10-in. size.

Thermocouples are coming into wider use in the portland cement industry as a means of measuring conditions within the kiln. Quite a few manufacturers are installing thermocouples like the one illustrated here at certain critical points, such as where slurry comes out of the chain section. Maintenance of a uniform temperature at such a location has been proven effective in minimizing ring formation in wet process kilns. Actual building up of a ring can be detected by variations in readings, and steps can be taken to reduce the tendency.

Likewise thermocouples in the back ends of kilns can indicate correctible conditions before they become serious. As an example, a sudden drop in temperature of 100 deg. F. or more at or near the back of a kiln will inform the operator that his kiln is cooling off in ample time to make necessary adjustments such as slowing the kiln speed temporarily. The thermocouple very definitely is a means of quality control through contributing to uniformity of flow and therefore uniformity of degree of burning of clinker.



While efficient fuel consumption is the main object of such instruments, much more uniformly burned clinker is another advantage derived. With these instruments, free oxygen in the exit gases usually is held to between one and two percent and with very slight variation.

Shown schematically here is a typical installation of an oxygen analyzer and a combustibles analyzer connected to a common sampling system. The analyses are transmitted electrically to a two-pen recorder located at the firing end of the kiln where it is readily available to the operator. The time lag of a minute or more before changes in the kiln register includes total time for the gases to sweep the length of the kiln, to be withdrawn by the sampling system, scrubbed and delivered to the analyzers, analyzed and the analysis transmitted to the records. This quick detection and elimination of variations is of great importance in obtaining optimum fuel performance and uniformity of product.

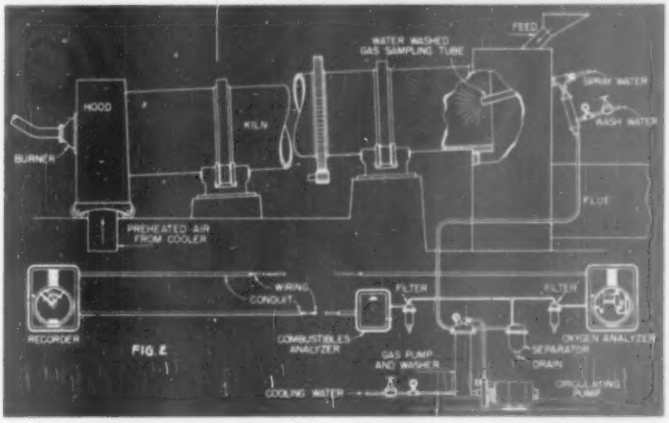
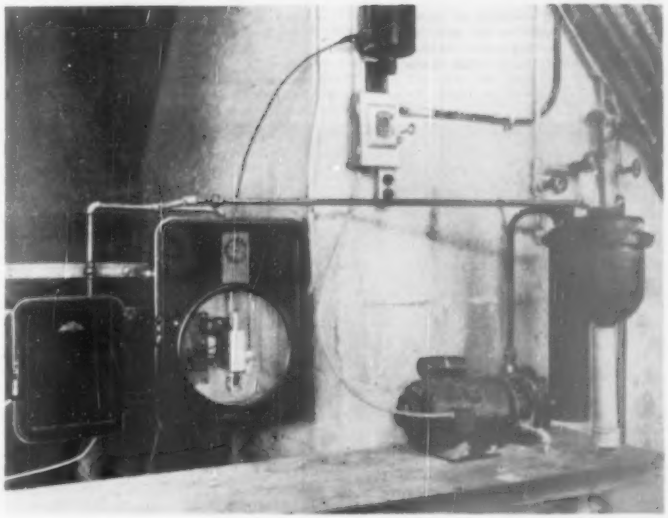


FIG. 2

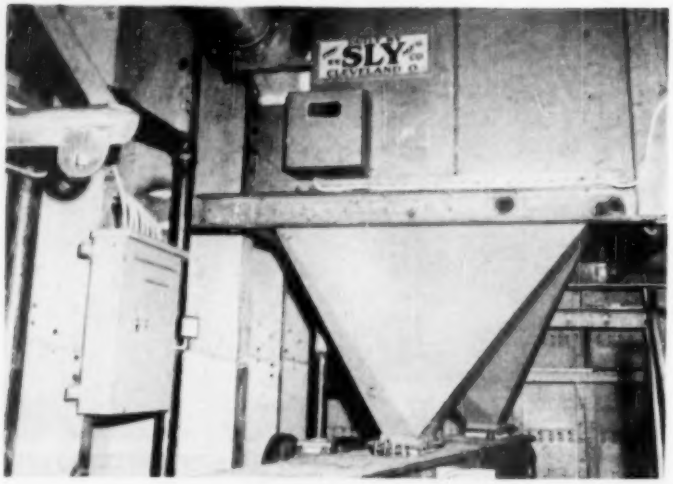
In the field of instrumentation, probably the outstanding development of the past year has been the installation of a number of continuous oxygen analyzers to control firing of rotary cement kilns. Until comparative recent date dependence had to be on periodic sampling and analysis because equipment manufacturers had not yet perfected instruments of the continuous variety that could accurately draw and analyze a representative sample. Getting a clean sample was one of the principal obstacles. Continuous analyses are important, due particularly to wide variations in quality of coal, and are effective in marked savings of fuel through maintenance of optimum burning conditions in kilns.

They are effective because variations from optimum fuel: air ratios can be detected quickly, and compensation made through fuel feed, for example, to bring conditions back to ideal quickly and with very little time lag. Effects of changes as read at the firing floor are indicated within a minute or two after a change has occurred. Such a high speed of response shows up small cycling variations that otherwise have an appreciable adverse effect on economy.

The operator can detect the effects of a poor run of coal, or insufficiency due to blockage of a coal feeder, etc., and adjust the coal or draft quickly, as well as compensate for other variables having adverse effects.



Dust Collection



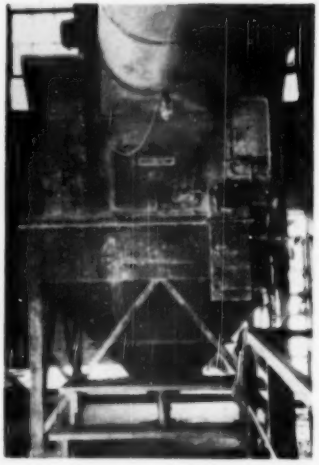
The illustration shows a dust collector on the steamer Samuel Mitchell that handles some of the output of the Huron Portland Cement Co., at Alpena, Mich. The dust collector shown is a No. 44, Unit DF. This boat assumed much importance in the portland cement industry as it was one of the first to use Airslides for conveying the portland cement from the hold of the boat to its final unloading assembly. Elsewhere is shown an illustration of the development of airslides and the extension of their use to the lime industry.

Airslides are sold by the Fuller Co., Catasaqua, Penn., and are being accepted widely as a simple and efficient conveying system. Dust collection in the cement industry needs little amplification here for from observations based on thousands of miles of travel each year it is evident that the portland cement industry is solving its own dust problems to such an extent that most of the plants in the field are models of neatness and cleanliness. Sacking plants, especially, are noteworthy for their cleanliness and lack of dust.

Silica producers are among the most active in keeping plants and loading dustless, and they are ever on the alert for any system, or combinations of systems, that will lessen the dust hazard in this field.

Among the factors to consider when on the subject of dust collection is stream pollution, especially in the Eastern sections of the United States. This problem is being corrected by the various states. As an example, the city of New York has had much publicity because of a water shortage. How ridiculous it must appear for the citizenry there to go bathless and shaveless because of an inadequate supply of water; yet, almost passing through the city is one of the largest potential sources of water in the United States—the Hudson river. The Schuylkill river passing through Philadelphia is being cleaned up at a cost of millions of dollars. This means that wet plants operating in the area will have to stop even the least stream pollution.

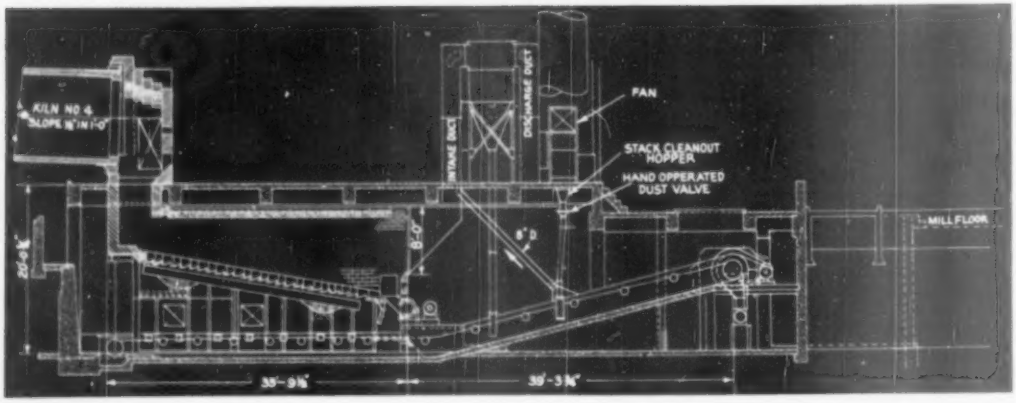
One solution is to go to a dry plant. This means collection of dust, for air pollution each year also is becoming very important from this one point of view alone. Dust collection so as to recover a valued product, or by-product, is being extended each year and steps are afoot to use small dust collectors to save the portland cement in some of the ready-mixed concrete plants. The illustration shows a Ratoclone dust collector at an Ohio operation.



The line drawing shows the layout of air-quenching clinker coolers with unit dust collectors for the new kiln in the Lone Star Cement Corp. plant at Dallas, Texas. The use of unit dust collectors placed at convenient locations about the plant, as contrasted with other systems where a large collector is served by a series of ducts, is indicated as a trend in all the rock products industries as exemplified in this Texas operation.

In this case, as in many others, the value of the dust is negligible, but by eliminating it, better working conditions are maintained and the labor situation improved. In other than the cement industry, bulk loading (as an example) can produce dust but inasmuch as the dust is out in the open and not confined in a building, its collection has not been attempted in a broad manner.

Covered hopper cars are relatively easy to load and keep the dust at a low point. In some of the rock products industries it is planned to ask permission of the railroads to supply box cars with two or more loading hatches. These will be simply large diameter nipples welded to the top of the box cars (and near each end) so that more dustless loading can be attempted.

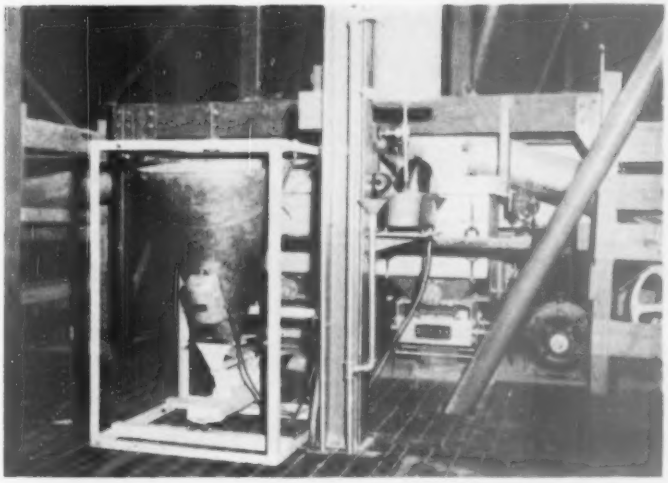


Batching

The term "batching" has become a part of the ready-mixed concrete terminology so definitely that readers are apt to reach a conclusion that its application is restricted to concrete, or concrete products operations.

The illustration shows a very neat batching installation used at the new masonry cement plant of the Pennsylvania-Dixie Cement Co., Nazareth, Penn. It is of relatively small capacity. The cone-shaped hopper contains a dry air-entraining agent. A small Syntron feeder operates under the cone. Just to the right of the top of the cone is a Clarkson (American Cyanamid Co.) feeder that proportions to the masonry cement a liquid plasticizing agent.

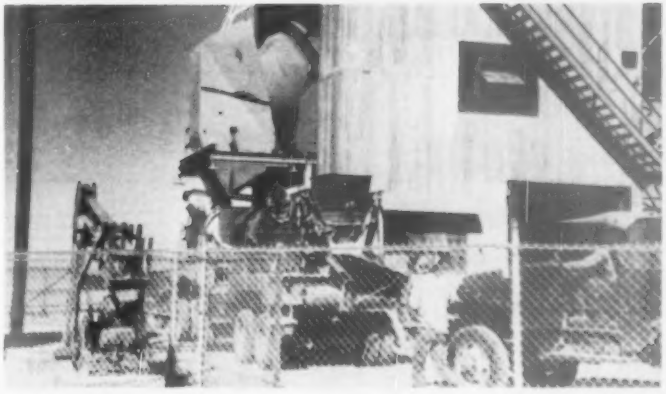
In the background is one of the two small fully automatic Butler weigh batchers for the ground limestone and portland cement. The materials all join in a steel hopper that feeds a 6- x 22-ft. Allis-Chalmers tube mill. The tube mill acts as a mixer and a re-grinder so that the resulting cement is of the highest quality. Limestone is ground in a Raymond kiln mill. Several masonry cement plants went into operation in other sections of the United States and this type of cement is finding a widening field of usefulness.

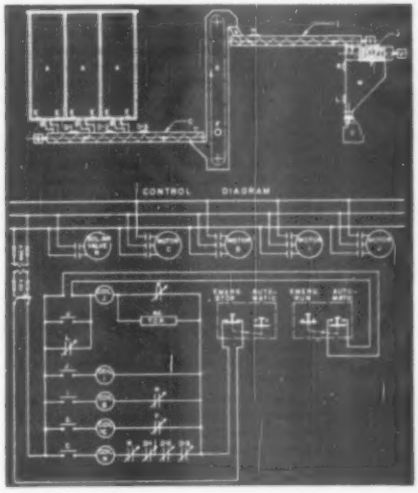


Of the many new ready-mixed batching plants built throughout the United States those that pre-mix the concrete represent a fair share of the installations.

The illustration shows a Western ready-mix installation using a 6-cu. yd. central mixer, one of the larger in the West. It enables the operator to batch 6 cu. yd. to a transit mixer rated at 4½ cu. yd. Long hauls in the West and Southwest are a part of the business so larger and larger trucks, including transit mixer trucks, have become a part of the transportation picture. As an illustration of what may be done, one industry on the Pacific Coast (not a rock industry) is planning on building 250 miles of paved roads and will run over this road bed, transportation units that will have a pay load of 97 tons net.

If these people can vision highways that will stand this loading and then co-operate in the design of such large capacity haulage units as these, the rock industries, and the ready-mixed concrete producer may see some changes in this direction creeping up on them.



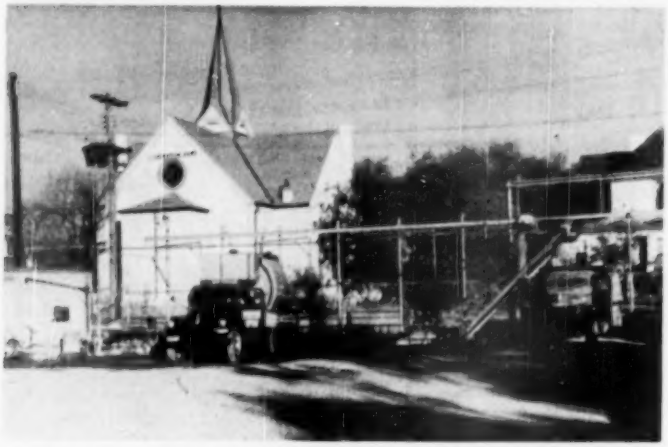


In the portland cement industry, especially in the pack house, modern technique shows a trend towards a slight variation of the batching theme, for modern designs are such that cement from the silos can be converged and distributed to the packing equipment so as to come within the scope of the term "batching." The line drawing shows the Huron installation at Detroit, Mich. Details as to how this type of installation functions are as follows:

Layout and control diagram is as installed at certain distributing plants for automatic feeding and conveying of cement. Packing machine "O" is supplied from tank "M" which is fitted with level control devices "K" and "L." When the level in tank "M" drops below "L," the entire conveying and feeding system is automatically put into operation in the following sequence: (1) Screen "J" is started; (2) Distribution conveyor "I" is started; elevator "G" is started; tunnel conveyor "C" is started; solenoid air valve "N" is energized, providing air to one airfeeder "B" and aerator units "E" and material feeds from one of the silos "A." A particular air feeder is selected either manually or by remote control. While supply tank "M" is filling, level control devices "D-1," "D-2," "D-3," in series with solenoid air valve "N," regulate the flow of air to the airfeeder.

Level control device "F" is connected in series with the stop circuit of the tunnel screw magnetic starter, serving as a protective device to shut off tunnel screw "C" and the feed in event of elevator overload. Level control device "H" is in series with the stop circuit of the elevator magnetic starter and prevents plugging of the elevator and tunnel screw in case of mechanical failure of distribution screw "I." The entire system is electrically interlocked to prevent plugging due to electrical failure on any unit. When level of the material in tank "M" reaches "K," the solenoid valve is immediately de-energized and feed is stopped. A time-delay relay allows the conveyors, elevator and screen to operate until the system is cleared; then the entire system shuts down. The cycle repeats as level "L" is again reached.

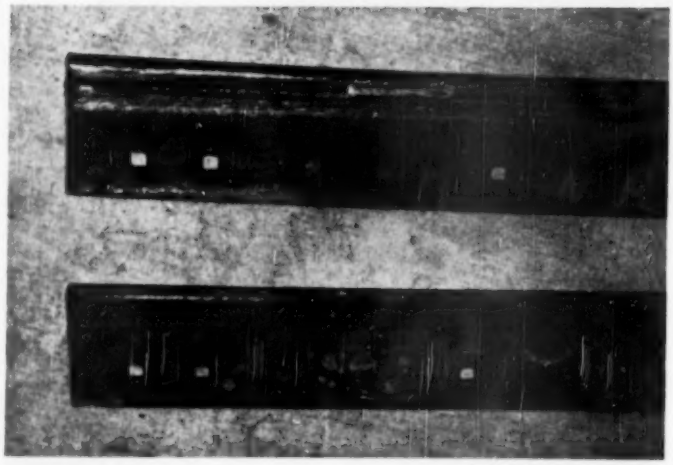
Maintenance



The accompanying illustration shows a form of maintenance that is very often over-looked and that is the matter of keeping the mixer trucks thoroughly clean. Often a retarding effect is noticeable because the owner of the truck does not have adequate facilities to dispose of the wash water (and its accompanying green or un-set portland cement).

The picture shows the truck body being washed out to a sump. The solids settle there, after which they are scraped out of the pit by a short inclined drag scraper that unloads to a dump truck. The picture was taken at the batching plant of the Albuquerque Gravel Products Co., Albuquerque, N. M. The maintenance of conventional trucks and mixer trucks has assumed such importance that often the care of these items requires more supervision than the processing of the raw materials.

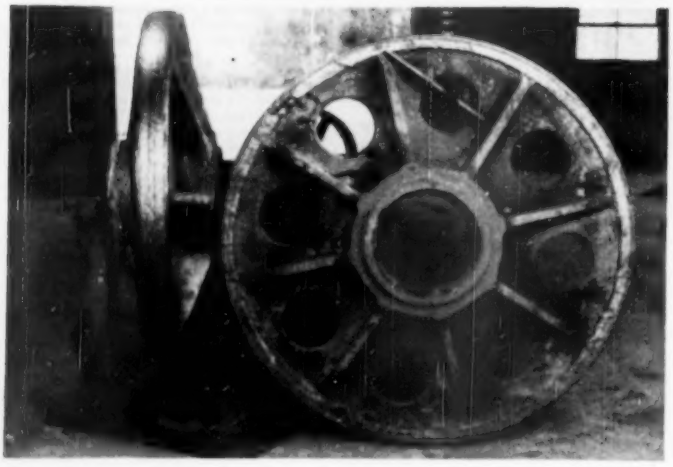
By having adequate cleanout and cleaning facilities like that shown the operator cannot only extend the life of his equipment but maintains his fleet of trucks so that they are presentable. One of the most effective ways to advertise is through use of moving equipment that is kept clean and bright.



Hard surfacing using tungsten alloys is used in so many instances in the rock industries that to compile a list of the items treated in that manner would take up considerable space. The illustration shows a grader blade hard-faced on an automatic electric head using Stoody automatic wire No. 130—a fabricated tube containing barium tungsten carbide, etc.

The development of carbide alloys has extended to the quarry field where the tungsten carbide drilling bit now is widely used. One operator of a quarry in the south is reported to have successfully worked out a system where if a tungsten carbide cutting edge has been broken or badly worn, this operator using welding techniques makes the repair.

Steel balls made of this alloy are said to have a sp. gr. of 14 and hence have a unit weight close to double that of steel. This type of grinding media might have a high cost but even the idea of using it in an experimental way is of considerable interest. Stellite, a product of the Union Carbide and Chemical Co., is another widely accepted hard surfacing alloy. Welding techniques have been extended to the welding of copper and other metals.



The illustration shows idlers of a Bucyrus-Erie shovel that have been hard-faced using Stoody automatic wire No. 122. Service life, it is said, on these items was increased three fold, or better. Idlers on Caterpillar tractors have been hard-faced similarly with automatic wire No. 103. In one instance, after nine months of hard usage, the beads of the hard surfacing rods were still visable on the built-up idler. Use of hard surfacing metal on such parts as these causes less wear on the opposing metal parts (in this case the track rails).

In general, it is possible to get five times the normal working life of tractor idlers by the use of hard surfacing techniques. In a similar fashion, crusher liner parts built up on automatic electric heads using Stoody wire No. 121 and overlaid with wire No. 103 has increased the life of the part three times or more. These repairs are on large operating units, the stoppage of which often is costly to the operator.

Building up of hammers that are used in the impact type crushers is practiced quite universally. At one Western operation that employed a hammer mill for manufacturing sand, the use of hard surfacing materials accounted largely for the success of the installation.

THOSE ARMY ENGINEER AGGREGATES!

Special and few commercial aggregates have been used

By NATHAN C. ROCKWOOD

IN HIS LETTER TO ROCK PRODUCTS, published in our October issue, 1949, p. 106, Byram W. Steele, chief, Structures Branch, Civil Works Office, Chief of Engineers, U.S.A., emphasized that the Army Engineer Corps were not interested in aggregates "for the garden variety of concrete," but only for "lean interior mass concrete," where the cement content can be cut to 2½ bags per cu. yd., using coarse aggregate up to 6-in. maximum size. So far as we can determine the Army Engineer specifications, particularly with reference to fine aggregate, have not as yet had any effect on specifications for commercial aggregates used in the "garden variety of concrete." The reason is, apparently, that the Army Engineers are using very little, if any, aggregates from existing commercial plants. Most of the fine aggregate recently used has been supplied in many instances by experienced commercial producers, but in plants especially designed to make Army specification materials and nothing else.

Under these circumstances the specifications appear to have been met satisfactorily. Although probably in most instances the fineness modulus (F.M.) limit of plus or minus 0.1 is not maintained. Indeed, we have heard the opinion publicly expressed by members of the Army Engineers' staff that it is not feasible to demand such a narrow limit under present producing conditions. This is partly accounted for by the Engineers as caused by deterioration of the fine aggregate in storage, handling, and in rehandling, but primarily in the concrete mixer, where with 6-in. rocks there is considerable grinding action. Since it is control of the fineness modulus of the material that actually goes into the concrete which is desired, it has been necessary to manipulate the grading and fineness modulus of the fine aggregate as supplied by the producer to fit the special conditions at each job.

Practically all the fine aggregates used thus far are what the Engineers call "manufactured," that is, they are either made entirely from crushed rock or gravel and boulders, or they are, in a few isolated instances, natural sand supplemented with crushed material. It is doubtful if any natural sand could be found which would meet the specification economically by mere screening and hydraulic separation. Since most commercial operations have good markets for all the coarse aggregate they can make, there is small inducement to make fine aggregate of it especially for the Army Engineers. In limestone operations there is a ready and steady market for fines as agricultural limestone, so it has not been feasible for commercial producers to recast their plants to supply limestone fine aggregates under such difficult conditions except at very fancy prices. Nevertheless, limestone is the preferred fine aggregate on many Army Engineer jobs, and to produce it at special plants results in waste of some 10 to 20 percent of fine material that in commercial plants would be marketed for agricultural limestone, which, of course, adds to the cost of the aggregate.

Most Controversial Point

The members of the Army Engineering staff have held two annual conferences in Kansas City, Mo., in March 1948 and 1949. The first conference had largely to do with the kind of aggregates it was proposed to use, with a great deal of discussion about the kinds and combinations it was decided to avoid. The main considerations were not to use aggregates that might prove reactive with high alkali cements and to avoid such combinations as silica sand and limestone coarse aggregate, because of their different coefficients of expansion, that is, they are regarded as aggregates which are "thermally incompatible."

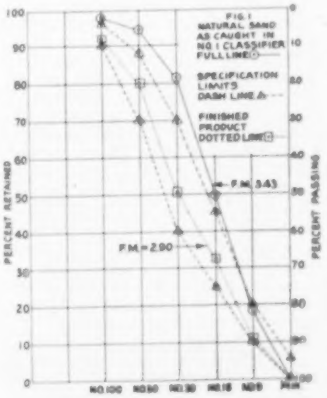


Fig. 1: Analysis of typical sample of raw material with fines washed out compared with specification limits

Perhaps more emphasis has been placed on these characteristics of aggregates than deserves, for at the first conference, R. H. Nesbitt, of the Ohio River Division Laboratory at Cincinnati, emphasized many other characteristics such as porosity, crystal structure, character of minor constituents, surface disintegration and other factors of equal importance. He is a geologist and petrographer and we think this quotation from his talk is of particular significance: "We geologists still take pride in saying that the engineer has yet to design a concrete that is as sound as the aggregates comprising it, providing, and a big providing, that uncoated aggregates are used. Coated aggregates are definitely objectionable because of their greater susceptibility to react with cement alkalies, and because of bond failures that must be expected between mortar absorbing coating and the enclosed sound particle." It was brought out at the second conference that some aggregates that apparently failed in freezing and thawing tests of concrete, did not fail when subjected to freezing and thawing tests by themselves.

That statement of Mr. Nesbitt, of course, merely repeats an old and well-known fact, but it does serve to emphasize that preparation of the aggregate is quite as important as any physical or chemical characteristic. A piece of aggregate, fine or coarse, that is an integral part of the concrete may act quite differently than one which for any reason is not. Nevertheless, the Army Engineers have probably put more stress on thermal incompatibility than on any other factor in their selection of aggregates, and this has resulted in opening many new quarries in granite and limestone, and the use of the same kind of fine aggregate as the coarse aggregate.

The thermal incompatibility theory to account for the disintegration of concrete was hatched and developed at the Clinton, Miss., laboratory of the Army Engineers, yet H. K. Cook, their concrete research specialist there, stated: "There were several combinations where the difference in thermal coefficient of expansion [between cement paste, and/or sand mortar, and aggregate] was greater than 3 [cement paste or mortar 6-6½, lime-

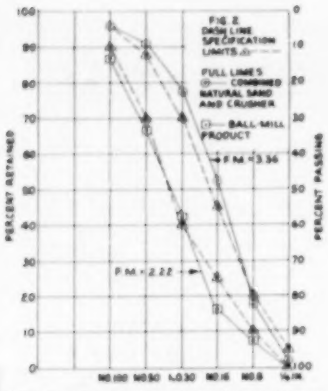


Fig. 2: Shown here is product of ball mill, and sieve analysis of the blend of natural washed sand and crusher product

stone 2—4], and the beam test showed very good durability. There are also, as a matter of fact, in this statistical analysis about 50 percent, or a half, of the combinations that show poor durability, which was accounted for by this difference of thermal coefficients, and there was about 50 percent that were unexplained." Yet it was on the basis of these tests that the Army Engineers have practically ruled out combinations of natural sand and limestone coarse aggregate.

Probably an equally important consideration in using "manufactured" fine aggregate of both limestone and granite has been the one already mentioned, that it seemed practically impossible to get the desired grading limitation with natural sands. The desired fine aggregate grading was discussed in some detail in the December, 1948, issue of ROCK PRODUCTS. The chief change has been to reduce the percentage of minus No. 100 mesh size because this size is apparently increased about 10 percent in the mixer, not necessarily by reduction of the fine aggregate, but more likely by rubbing off the edges and corners of the pieces of coarse aggregate, especially in the case of limestones. Since the prime objective, stated and restated many times by Mr. Steele, is to reduce the water-cement ratio to a minimum, it is obvious that too much minus No. 100 mesh, by increasing the amount of water required for workability, is not an unmixed blessing.

Typical Sand Plants

A few typical plants have been described in ROCK PRODUCTS during 1949. The September issue contained some of the details of the Buggs Island dam plant, in Virginia, where a granite is quarried for both fine and coarse aggregate. The fine aggregate consists of the minus No. 4 mesh with some of minus No. 100 mesh removed, and a crushed product made from the minus ¾-in. plus No. 4 mesh added as needed to bring the fineness modulus to about 3.0, with the belief that this was reduced in the concrete mixer, through grinding, to the specification requirement of between 2.3 and 2.8. The wet process is used, with a rod mill for reducing the ¾-in. to sand sizes, and a hydro-separator to blend the various sizes and get rid of the excess fines.

The aggregates plant at the Clark Hill dam in Georgia was described in the July issue. This is also a granite aggregate, and the operation is very similar to that at Buggs Island. In both instances a single blend of sand is made and delivered to the concrete plant, with four sizes of coarse aggregate. At the conferences in Kansas City, already referred to, it appeared to be the consensus of opinion that satisfactory control of the fineness modulus could be obtained only by making two sizes of sand split on about the No. 16 or No. 30 mesh, and the more recent operations now make fine aggregate in two sizes, which are blended as conditions demand at the concrete mixing plant.

Descriptions of some of the plants using limestone aggregates will appear in later issues. All of these plants, as far as the concrete mixing and placing are concerned, are distinguished by elaborate methods to cool the aggregates before or during placing the concrete. The theory is that in the interior of massive concrete structures considerable heat is generated during the hydrating and hardening of the cement, that this causes expansion, while the exterior is cooling off and shrinking. Thus, tension in the outer surface results in cracks. It is to reduce these interior temperatures that both lean mixtures and artificial cooling of the aggregates is resorted to. To the producer of the aggregates it means the additional investment of about $250,000 in refrigeration machinery and piping.

The 1949 conference of the members of the Army Engineer staff had much to discuss in connection with this new scheme of cooling aggregates, and its cost, which was variously estimated at about 35¢ per cubic yard of concrete. In some instances the contractor is compelled to build an ice plant, and the crushed ice is used in lieu of some of the mixing water. There is one point in this connection not brought out in any of the discussions. This is the scientific fact that lime is slightly more soluble in cold water than in warm water. This may to some extent affect the whole reaction in the setting and hardening of the concrete.

Processing "Subgrade" Aggregate

For the Dorena dam, near Cottage Grove, Ore., which is considered a relatively unimportant concrete project since the dam itself is 4,000,000 cu. yd. of earth-fill, with only 162,000 cu. yd. of concrete appurtenances, the contractor was permitted to use a local sand and gravel, with a low alkali cement. This operation, described in considerable detail in the October, 1949, issue of ROCK PRODUCTS, is one of the most interesting to commercial producers, because it was a "sand correction" job rather than a sand manufacturing one.

By reference to the flow sheet on p. 90 of the October issue, it will be seen that there are three sources of raw material for sand: (1) The minus 2/16-in. wash from the gravel scrubber-screen; (2) the minus 3/16-in carried over with the gravel and reclaimed in the gravel screening operation; (3) the minus 3/16-in. product of two short-head gyratory crushers. Since the natural product contained an excessive amount of clay and loam, the wash from the scrubber went direct to what is termed a spiral sand classifier, but in this installation is primarily a sand scrubber and washer. This was to get a fairly clean basic sand, which constituted about 50 percent of the final product. The sand recovery from the gravel screens was comparatively insignificant (about 5 percent of the final product). The product of the crushers, which in whole or in part also was put through a ball mill, constituted the other approximate 50 percent of the finished product.

The problem of sand correction was relatively simple. Fig. 1 shows an analysis of a typical sample of the raw material with fines washed out compared with the specification limits. We have here obviously a material which is too coarse—too much retained on the No.'s 16, 30, 50 and 100 mesh sieves. This is the usual result of the excessive washing required to get rid of clay and loam. For

(Continued on page 173)

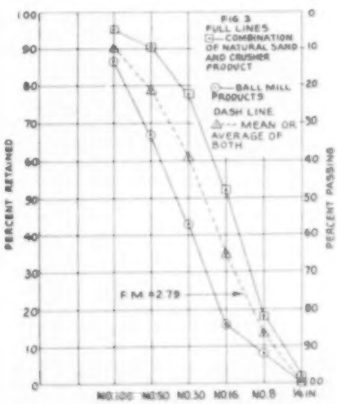
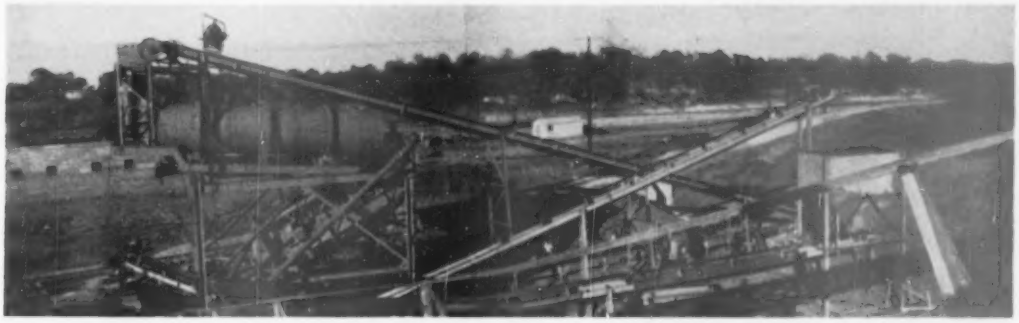


Fig. 3: This shows combination of natural sand and crusher product, ball mill products, and mean or average of both



At dam site, coarse aggregates are put through two scrubbers operating in parallel and then screened before delivery to contractor's storage. Reclaimable stone passing screens is collected in bin, right

Aggregates for Whitney Dam in Texas

Crushed limestone and manufactured sand produced dry by Iowa firm using hammer mills and air separator. Portable crushing plants in quarry expedite production

By BROR NORDBERG

IN RECENT MONTHS, a number of articles have been published in ROCK PRODUCTS covering the production of aggregates for the construction of mass concrete structures by the Corps of Engineers. There also have been timely articles involving consideration of the governing specifications for such projects and the approach of the Corps of Engineers to securing more durable concrete structures. The overall subject is important because of the possible influence of these rigid specifications on future requirements that may confront producers of aggregates in supplying materials for other purchasing agencies. And there are many more sizable U. S. Army structures in the design stages or being planned that will require many millions of tons of aggregates in the years ahead.

In many cases, the rigidity of the specifications has been such that producers have encountered extremely difficult obstacles after a plant has been built and placed in operation, which require expensive alterations to correct. And there has been a great deal of difficulty and rejections because government inspectors have been inflexible in requiring strict adherence to specifications. The trouble is that some of these plants have not had the necessary flexibility, or we might say sensitivity, built into them from the start and they have not always been built with full appreciation of the problems involved in meeting really tight specifications. It is true, of course, that some requirements have been imposed that are definitely all out of reason and it is certainly questionable whether or not slight deviations from perfection that would permit acceptance of aggregates will reflect on the ultimate durability of a structure or any of the other desired properties of the concrete.

Superintendent Leroy F. Ramer with his constant companion, "Boy," who has no qualms about going anywhere in the plant with his master

Concrete Materials and Construction Co., Cedar Rapids, Iowa, a company which has had a great deal of experience in filling large contracts for concrete aggregates, is operating a plant at Carbon, Texas, that apparently is meeting Corps of Engineers' specifications without too much difficulty. The plant is producing crushed limestone and manufactured sand by the dry process and of such uniformity that the batching scales of the prime contractor seldom need more than slight re-setting to compensate for variations in gradation. In a recent run, for example, batching proceeded for six weeks straight with less than 1 lb. deviation on percentages of aggregates, and no variations in mixes were necessary. Final inspection is done at the concrete batching hopper and there are no army engineers stationed at the crushed stone plant.

This plant started production in December, 1948, and will continue to operate late into 1950 in supplying some 1,200,000 tons of aggregates for the Whitney Dam and Reservoir project. Site of the construction, a $41 million project, is on the Brazos river about 65 miles south of Fort Worth and 100 miles by rail over the Mis-

One corner of quarry with one of two plants that are operated here. Bin, extreme right, is truck-loading hopper. Note shallow quarry

souri, Kansas and Texas railway from the aggregates plant. The dam is concrete gravity with earth embankments and is a little over 40 percent completed. Cement factor is 3 sacks per cu. yd. for interior concrete and 4 sacks per cu. yd. for exterior concrete, using Vinsol resin added at the mixer for air-entrainment.

Six sizes of aggregates are delivered by rail to Whitney, including two separated sizes of sand. Originally, the specifications provided for a single sand product but, by mutual agreement, two separate sand products split on the No. 16 mesh are supplied, which has aided materially in meeting the gradation and fineness modulus requirements for the composite. The contractor batches the sand as two separate materials into the mixer.

The requirements by sizes are as follows:

Size	Percentage
6- x 3-in.	18.4
3- x 1½-in.	25.4
1½- x ¾-in.	15.0
¾-in. x No. 4	13.2
No. 4 - No. 16 (sand)	11.0
No. 16 Minus (sand)	17.0
	100.0

The sand comprises 28 percent of the total, some 336,000 tons, and consists of 40 percent of the coarser sand and 60 percent of the finer sand by weight.

Specifications

Specifications for coarse aggregates have the usual standards for soundness, cleanliness and quality of material. It is specified that the particle shape of the smallest size of coarse aggregate shall be generally rounded or cubical and that the tolerance on flat and elongated particles

One of two portable crushing plants operating at quarry. Portable bin allows continuous operation of plant and fast loading of trucks

in all sizes shall be governed by placeability requirements. The grading requirement of the coarse aggregate within the separated size groups is given in Table I, page 130.

Fine aggregate is required to meet the following gradation (a composite in this case):

Sieve	Passing (%)
No. 4	95-100
No. 8	80-90
No. 16	55-75
No. 30	30-60
No. 50	12-30
No. 100	3.5-10

Fineness modulus, as delivered to the mixer, must fall within 2.40-2.90 with grading of the aggregate so controlled that the fineness moduli of at least nine of ten test samples as delivered to the mixer shall not vary more than 0.20 from the average fineness modulus.

This gradation and fineness modulus are being met by producing a No. 4 to No. 16 mesh sand and a minus No. 16 mesh sand which are proportioned 40 percent and 60 percent by weight, respectively, into the mixer at the damsite.

To meet the composite gradation, the coarse sand fraction is produced to a fineness modulus between 3.3 and 4.1 and to meet the following gradation:

Sieve	Passing (%)
No. 4	88-100
No. 8	50-75
No. 16	0-38
No. 30	0-30
No. 50	0-25
No. 100	0-7

Fineness modulus of the fine fraction falls between 1.8 and 2.1 and is produced to meet the following gradation:

Sieve	Passing (%)
No. 8	100
No. 16	92-100
No. 30	50-80
No. 50	20-33
No. 100	6-12

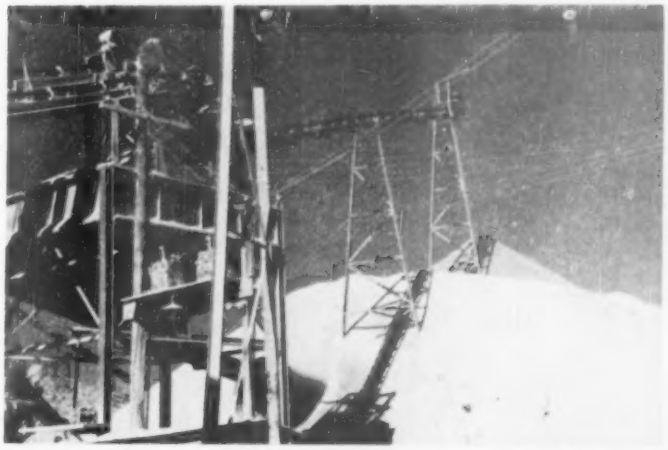
Plant Features

Location of the plant is at the nearest approved source of stone favorably situated with respect to facilities for shipment by rail to the damsite. After core drilling, the quarry was opened in virgin territory and a plant was designed and built specially to meet the requirements as set forth. The stone is a hard, very sound limestone of about 65 percent $CaCO_3$, 8 percent $MgCO_3$ and a small percentage of SiO_2. It is overlaid by 4 to 13 ft. of topsoil and weathered, fragmented stone which must be stripped. There are some vertical clay pockets which are cast aside by the excavating shovels, and clay partings are encountered at intervals. It was determined that the clay could be broken down and removed successfully by dry screening after crushing, with some waste, and that a completely dry processing plant was preferable to a washing plant.

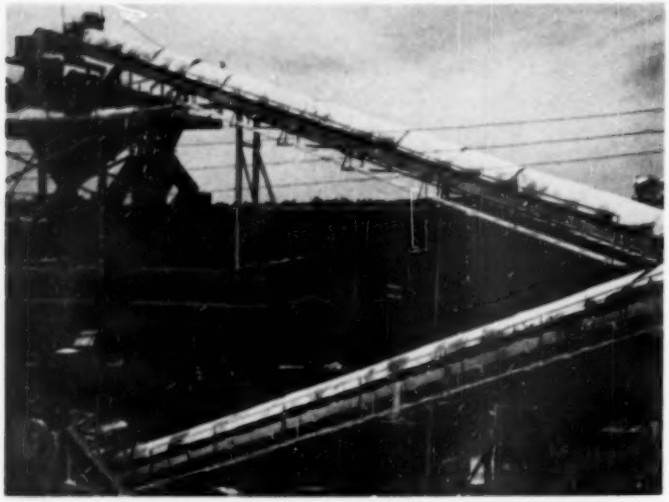
Designed for a capacity of 400 t.p.h., the plant has reached a peak of 511 t.p.h. With favorable weather conditions, production averages approximately 3700 tons per 9½-10-hr. operating day.

Trap has capacity for two truckloads of stone to assure uniform loading of belt conveyor to scalping screens

Minus 16-mesh material is fed into this 16-ft. air separator for removal of excess minus 100-mesh material. Finished fine sand is conveyed to bin over car and fines to a waste bin



Intermediate surge pile, background, is source of feed for fine reduction and sand manufacture



Screening setup for 3- x 1½- and 1½- x ¾-in. sizes, showing roll crusher and hammermill, lower left, for crushing oversize, which is then returned to screens

The plant differs in several respects from others recently built to supply projects being built by the Corps of Engineers. It is built for continuous operation, and bin capacity for each size of finished product is limited to 75 tons, which means that sufficient cars must be kept available for shipment or the plant must shut down. The shuttle consists of 241 hopper cars of 70-ton capacity. For a single shift of 9½ hr., the peak has been 63 carloads shipped to the damsite.

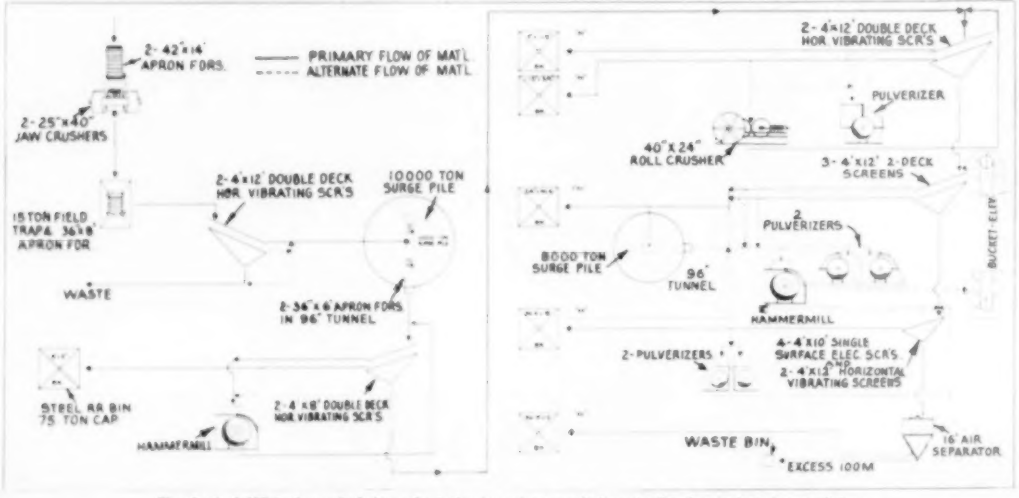
While bin capacity for finished materials is limited to a single carload, the plant design provides for intermediate storage of partially processed materials. A 10,000-ton surge pile of stone that has been put through the primary crushers is a reserve against breakdowns in the quarry, sufficient for more than two days crushing and screening. A second surge pile of 8000 tons for small stone permits balancing the production of sand with that of the coarse aggregates, and second-shift production of manufactured sand if required. There are seven hammermills in the plant proper and a roll crusher, so arranged with respect to sizing screens between that extreme flexibility is permitted in the adjustment of size proportions.

In the small size ranges, the reduction ratios are modest, which is conducive to cubical particle shape, and mill speeds are so calculated that each mill has a definite function in producing the range of particle sizes desired. A series of flop gates at the end of each screen and arrangements for the splitting and re-combination at strategic points are the means of regulation for a flexible re-crushing operation.

While the plant has a comparatively large number of crushers and screens, the multiplicity of units is productive of flexibility and accuracy in sizing; also, the plant, through duplicity of screens, etc., can be operated at reduced rate of capacity in event of breakdown. It is a 100 percent diesel-powered plant, and utilizes belt conveyors for intra-plant transportation. Total connected horsepower in diesel engines is 2347 including one unit of 450 hp. to develop electricity to drive small motors for vibrating screens, feeders, etc., and for two 100-hp. electric motors driving two pulverizers in the sand section where it is extremely dusty.

Sieve Size U.S. Std. Sq. Mesh	Percent by Weight Passing Individual Sieves			
	No. 4 to ¾-in.	¾-in. to 1½-in.	1½-in. to 3-in.	3-in. to 6-in.
7-in.				100
6-in.				90-100
3-in.			90-100	0-15
2-in.			20-55	0-5
1½-in.		90-100	0-10	
1-in.		20-45	0-5	
¾-in.	90-100	0-10		
⅜-in.	30-55	0-5		
No. 4	0-5			

Table I Grading requirements of coarse aggregate within separated size groups



Flowsheet of 400 t.p.h. crushed stone plant, showing primary and alternate flow for product size regulation

Of the tonnage delivered from the primary crushers, approximately 24 percent of total material handled is wasted, consisting of 12-15 percent wastage at the scalping screen and the balance, fines wasted from a mechanical air separator in the sand flowsheet.

One of the outstanding features of the entire operation, in our opinion, is the efficiency with which stone from the quarry is crushed and delivered to the screening plant. Delays to plant operation so common to commercial crushed stone plants, in the operation of power shovels and in truck operation due to bridging in crushers, have been eliminated through use of portable primary crushing units at the quarry face, with truck hoppers that enable trucks to be filled and dispatched with great speed. Thus, irregularities due to variations in shovel output are minimized and the main plant is kept uniformly loaded at a high rate of production.

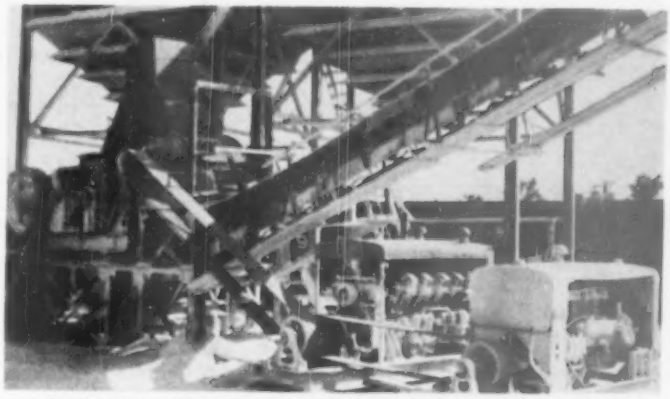
Quarry

The ledge of limestone being excavated ranges from 16 to 24 ft. in depth and is underlaid by shale. Top soil is stripped by an Allis-Chalmers tractor with Gar Wood dozer, a Caterpillar C-8 tractor with dozer and two LeTourneau Carryalls of 9- and 11-cu. yd. capacity. A LeTourneau rooter sees some service on top of the ledge in the loosening of weathered toprock which is loaded by a ¾-cu. yd. Cummins diesel-powered P&H shovel into Koehring Dumptors for disposal.

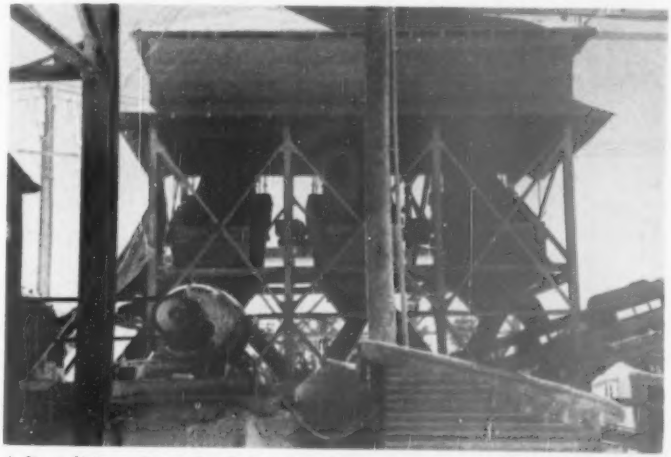
Drilling is done by four Gardner-Denver D-99 wagon drills which sink blast holes of 2⅞- down to 2¼-in. dia. to within a foot of the quarry floor. Air is supplied by an 800 c.f.m. Ingersoll-Rand stationary compressor driven by a 160-hp. Murphy diesel engine, or from a standby 500 c.f.m. unit driven by a 125-hp. G.M.C. diesel engine. An average blast consists of shooting four rows of vertical holes (160 total) spaced 11 ft. apart with 8-ft. burden, to bring down 25,000 tons of stone. The holes are charged with Atlas 60 percent powder in the bottoms and filled with Geladyne to within 4 ft. of the tops. They are fired with Rockmaster O, A, B and C split-second delay caps wired in series.

Blasting efficiency is excellent, with a yield of 5.1 tons of stone per lb. of powder and very little stone is brought down of sufficient size for secondary drilling and blasting. In producing 670,000 tons of stone, as of November 1, there were insufficient boulders cast aside by the shovels to warrant further blasting.

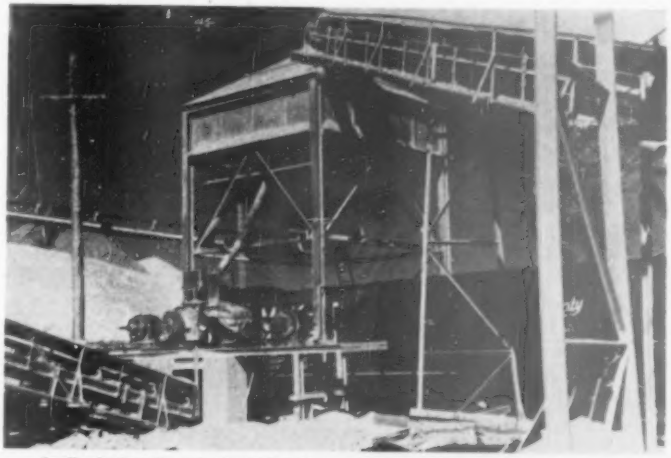
Excavating equipment consists of a 1½-cu. yd. Northwest shovel powered by a 145-hp. Murphy diesel engine, and a 1½-cu. yd. P&H shovel driven by a 130-hp. Caterpillar diesel engine. Each shovel is operated in connection with an Iowa rubber-tired portable primary crushing plant, consisting of a 42-in. x 14-ft. apron feeder



Two diesel engines, hooked in tandem, drive pulverizer for crushing 3- x 1½-in. stone

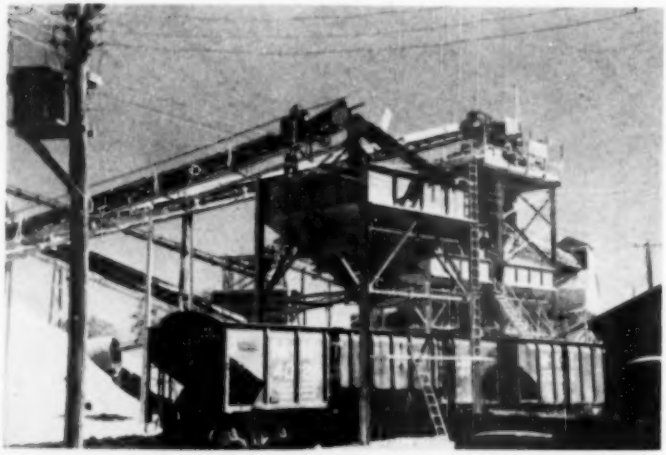


A ⅜- x ¾-in. product and a ⅜-in. x 4-mesh product are screened here and re-blended for flexibility in producing No. 4 x ¾-in. stone

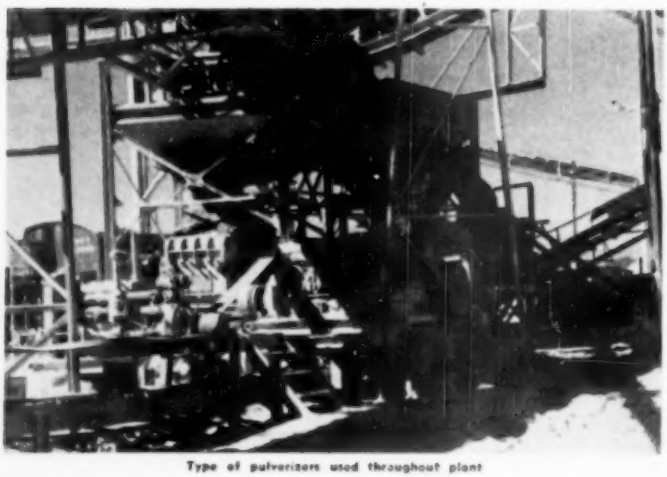


Small pulverizers for reduction of 4- x 16-mesh product in production of additional fines

Stone containing clay is scalped out by screens, right, and wasted. Conveyor, extreme right, fills surge pile for plant feed



Railroad cars are loaded from 75-ton capacity bins. Bin, foreground, holds 6- x 3-in. stone and two bins, right, hold 3- x 1½- and 1½- x ¾-in. stone



Type of pulverizers used throughout plant

which regulates the flow into a 25- x 40-in. jaw crusher set to yield a product of 7-8-in. maximum size. The discharge is put into a 12-ton bin from which a short inclined belt conveyor loads the trucks. Each portable crushing plant is driven from a 120-hp. Murphy diesel engine and can be moved with its bin, by tractors, and reset in 15 minutes ready for operation in a new location.

Six short wheel-base Ford gasoline trucks with Insley bottom-dump semi-trailers haul 7½ tons per load a distance of about 700 ft. to a 15-ton trap, or hopper, from which the stone starts its flow through the plant.

This system of crushing and haulage is productive of high quarry output and rate of delivery to the plant. One advantage is that large boulders or those of borderline size, likely to hang up in the crushers, are easily spotted and cast aside. By virtue of having a 12-ton truck-loading bin at each crusher set-up, trucks can nearly always be loaded without delay. They are not required to haul large stone, which means more tonnage to the load, and maintenance is moderate as a result. A truck can be loaded in 45 seconds after it stops for a load at the primary crushing plant, where an operator starts and stops the loading belt by push button.

Capacity of the receiving trap, or hopper, which pays out stone to a 30-in. belt conveyor that splits its load over two scalping screens, is 15 tons, or two truckloads, which provides reserve between loads. A truckload of stone will flow out of the trap over a 36-in. x 8-ft. Iowa apron feeder to the belt conveyor in 55 seconds. A man is stationed at the trap to trip each truckload as soon as it stops over the hopper, and the discharge is practically instantaneous. A quick turn of a crank, and the bottom discharge gates are drawn up and the truck is on its way. Each truck averages 100 loads per day.

The main conveyor belt, and all conveyor belts in the plant are 30-in. wide and rated at 500 t.p.h.

Scalping

Stone carried by the primary belt is split over two 4- x 12-ft. Iowa double-deck horizontal vibrating screens which scalp off material to be rejected. The top screen decks carry 1- and 1½-in. square openings and, on the bottom decks, the screen openings are ⅝- and ½-in. square mesh. During wet weather, all material passing through the top decks is wasted while, under favorable quarry conditions, only that passing through the lower decks is wasted. Rejected material is conveyed either into a truckloading bin for disposal or to a reject stockpile. Rejects at this point amount to an average of 12 to 15 percent of total material delivered.

Stone coming over the top decks,

(Continued on page 171)

Hard cherty limestone being processed for use in construction of dam near Rochester, N. Y. Aggregates given preliminary crushing in quarry are then trucked to damsite for further reduction

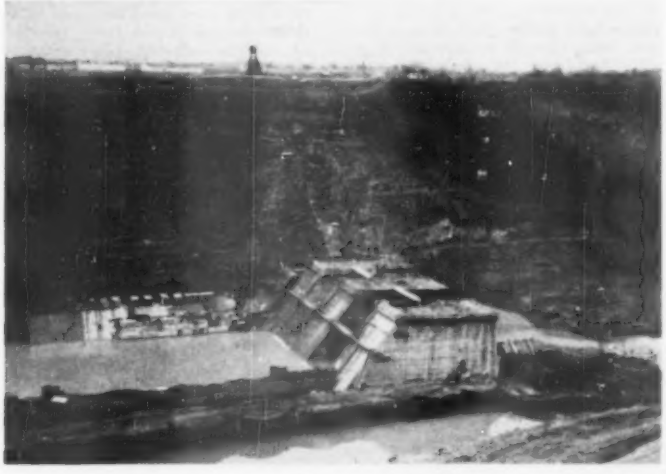
Concrete batching plant as seen from opposite side of Mt. Morris dam site on Genesee river

Wet Process Manufactured Sand for Mt. Morris Dam

By WALTER B. LENHART

MT. MORRIS DAM is located on the Genesee River about 40 miles south of Rochester, N. Y., and its construction is under the direction of the United States Corps of Engineers. The contract for the construction was awarded to the Mt. Morris Dam Builders, Inc., a newly formed organization, consisting of five well-known construction contractors.

The dam is to afford flood protection for the inhabitants of the lower Genesee river area which, in the past, has been subjected to flash floods of great intensity. One in 1865, at its crest, dumped 24,000,000 g.p.m. of water into the area and submerged the business and residential districts of Rochester under 8 ft. of water. This is three times more water than falls over the American Falls at Niagara. Since then 12 or more other floods have occurred, all causing great destruction in the fertile and industrial areas. No power will be developed at Mt. Morris. The dam involves the placement of some 760,000 cu. yd. of concrete.



Down-stream section of Mt. Morris dam

ROCK PRODUCTS has been following the construction of dams throughout the United States, not that it is primarily interested in dam construction as such, but because the aggregates plants built to serve the projects usually are owned, at least in part, by established producers of rock products. It thus becomes a case of the producer moving his facilities to the job. Even though many of these plants are temporary, they usually embody the latest techniques in processing. Tonnages are large generally and the designs are such that low operating costs can result.

Methods and practices used at the large dam construction projects, pioneered by the U. S. Army Engineers, are often the pattern that others in the construction field follow.

There are five large contracting firms involved in the construction of Mt. Morris dam. The Arundel Corp. of Baltimore, Md., is one of the group. This large aggregate and ready-mixed concrete producer needs no introduction to many of our readers. The other contractors are: L. C. Maguire, Los Angeles, Calif.; L. E. Dixon Co., San Gabriel, Calif.; Shofner, Gordon & Hinman, Los Angeles, Calif.; and The Hunkin-Cokey Construction Co., Cleveland, Ohio.

The staff of the U. S. Army Engineers at Mt. Morris is headed by J. E. Harns, resident engineer; H. V. Kramer, assistant resident engineer; Jack Perry, field engineer; T. H. Wheeler, concrete technologist, and H. T. Lebrenz, office engineer. The district office for the U. S. Engineers is in Buffalo, N. Y., with Col. Frank Forney in charge, under whose general supervision the dam is being built.

One of truck fleet that haul stone to final screening plant at dam site

For the contractors, Warren Black is resident partner; W. V. Greeley is project manager; Ray Martin, project engineer, and George Brayle, field engineer. Both organizations have offices near the construction site.

At the many dams that have been visited personally the past few years, all processing of aggregates from the excavation to the finished product was being done near the damsite. Mt. Morris deviates a little in that the aggregate, which is a hard limestone, is quarried at the Le Roy quarry of the General Crushed Stone Co. At that quarry the stone is given its preliminary crushing, after which the minus 7-in. along with the plus ¾-in. stone is trucked to the dam, a distance of about 28 miles. Haulage contractor, R. R. De Witt, of Pavilion, N. Y., has a fleet of 22-24 ton capacity rear-dump trucks on this haul. (Winch-Lift Trailer Co., and Daybrook bodies on Brockway trucks are used.)

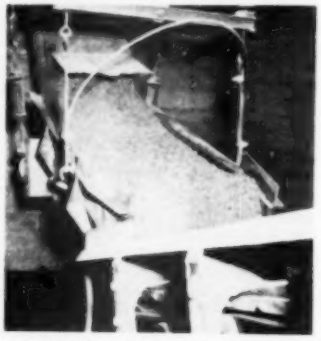
Processing the Stone

The general scheme of processing this rock parallels practice at the other dams visited in that four sizes of coarse aggregate are prepared, with the top size being minus 6 in. plus 3 in. The four sizes of stone are stockpiled in large service piles and reclaimed by tunnel belts.

The other sizes of stone are: minus 3 in. plus 1½ in.; minus 1½ in. plus ¾ in. and minus ¾ in. plus No. 4. Before being sent to the Johnson automatic batching plant, they are given a preliminary rinse as the material passes over a 5- x 12-ft. double-deck, Telsmith rinsing screen. A surge pile of large capacity precedes the first crushing operation at this aggregate plant.

The four main Tyrock processing screens are mounted over wood bins in such a manner that most of the coarse size from the first of these screens can be chuted direct to a 48-in. Telsmith standard Gyrasphere, or this size can be drawn from the bin (along with other larger sized crushed rock) via a short inclined belt and be fed to a 4-ft. Symons cone crusher. A common return belt puts the crushed products from both these crushers back onto the longer belt from the initial crusher.

In keeping with the U. S. Army Engineers' preference to have a fine aggregate (sand) of the same thermal coefficient of expansion as the coarse aggregate, at Mt. Morris the sand is a manufactured product using as the raw material the minus No. 4 material from the main bank of sizing screens into which has been bled some of the minus ¾-in. plus No. 4 material. A surge pile of this material is provided and material from it is withdrawn to an inclined belt via a Jeffrey electric vibrating feeder. This material passes over two wet 4- by 12-ft. Telsmith (Vibro King) vibrating screens. The oversize goes to an 8- by 12-ft. Marcy peripheral discharge rod mill and the pulp from the rod mill is pumped back to this screen



Vibrating feeder loading belt conveyor that feeds sand plant

so that a positive top size in the sand is maintained. However, the amount of oversize from the rod mill is so small that it is not too important a deviation of rod mill practice as is carried out at the other dams visited last year. (Bugg's Island, Va., Sept., 1949, and Clark Hill, Ga., July, 1949, and Dorena Dam, October, 1949 issues of ROCK PRODUCTS.)

The stone being processed in the rod mill is a cherty limestone. When minus ¾-in. plus No. 4 material is subjected to 500 cycles in the Los Angeles rattler test the loss is in the 20 percent range. It is probably harder and tougher than most of the rock being processed for projects that have been previously described. The rod mill started with new liners in April, 1949, and at time of inspection the work at Mt. Morris was about 33 percent completed. No record is available of liner wear when expressed in terms of pounds of wear per ton of sand produced, but the liners that came with the mill are still in use. The engineers expect to examine the liners for wear sometime this winter. The rod wear has been from 1.00 to 1.25 lb. per ton of sand produced and the mill has been turning out 65 tons of sand per hour. A pulp that is thick like pancake batter is carried in the rod mill and a few of the ports in the periphery of the shell have been closed off so as to hold the pulp in the mill longer. The steel rods used as the grinding media were supplied by the Bethlehem Steel Co.

The undersize from the two screens ahead of the rod mill flows to an 8-ft. wide by 39-ft. long duplex Dorr bowl classifier that is provided with a 22-ft. dia. bowl. The unit is powered by a 3-hp. and a 15-hp. motor. All the sand used at Mt. Morris comes from this unit and the finished material falls to one of two inclined stacker belts (Nos. 14 and 15 on flowsheet) and two piles of sand are built up over the reclaiming tunnel. It is practice to allow one pile to drain while the other is being built.

The reclaiming tunnel consists of an 8-ft. dia. Armco steel pipe with a French fill around the tube, supplemented with a drain tile so that the sand piles have good drainage under them. In the tunnel there are four 33- x 26-in. Telsmith cobble gates for the minus 6-in. stone, and for the

Bowl-rake combination classifier, left, and rod mill, extreme right

sand and smaller aggregates sizes there is a total of 21 Boquard bin gates, each 20 x 18 in. and supplied by Telsmith.

A spot check on the rod mill feed was taken and it possibly is a good representation of the type of limestone going to the sand manufacturing section. The screen analysis was as follows:

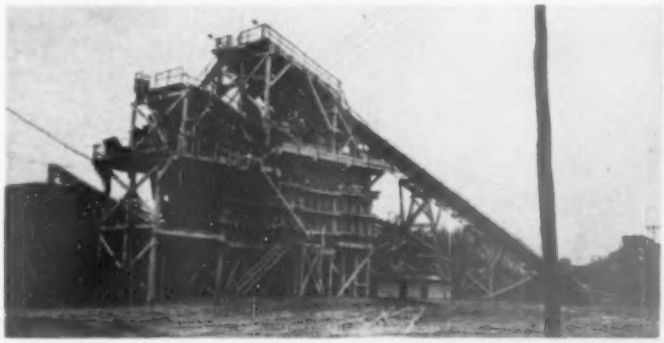
Retained on:	Percent
½-in.	0.8
¼	6.6
No. 4	31.7
8	22.3
16	15.2
30	9.8
50	5.7
100	3.9
200	1.9
pan	2.0

The hardness and toughness of the material is such that there apparently is little if any degradation of the aggregate in the 4-cu. yd. Koehring mixers used in the batching plant. Several times since the operation started, the laboratory staff has "shaken out" batches of concrete and found that the amount of minus 100-mesh material had increased only about 4 percent; 11 to 12 percent minus 100 mesh is considered normal. Apparently the 6-in. aggregate does not have an undue grinding effect on the rest of the finer aggregates in the mixer.

We were permitted to examine laboratory records of screen sizing tests on the sand as produced.. Systematic samples are taken several times each shift, grab samples at intervals, and composites. From the data, we observed that specifications were being met well within the prescribed limits and apparently without too much effort on the part of the operating staffs. The tabulation given below is not an average one but is a typical report and these data show the specification requirements and results of one test.

Retained (mesh)	Specifications	Screen test as of Nov. 2, 1949
4	0-5%	0.0
8	5-15	9.4
16	10-20	22.7
30	15-25	24.5
50	15-25	18.0
100	10-20	13.2
200	5-10	7.7
pan	3-5	4.5
F.M.	2.40-2.90	2.61

The operators try to hit 2.60 on the F.M.



Discharge from gyratory crusher, extreme right, is dumped over four vibrating screens at top of structure, left

Discharge from secondary crusher being elevated to screens

The batching plant consists of a fully automatic Johnson batching system using three 4-cu. yd. Koehring mixers. The automatic batcher scale hoppers are provided with Valvair Corp. vibrators. No pozzolanic material is used in any of the mixes and the portland cement used has some Vinsol resin interground with the cement. At the Mt. Morris batchers, additional Hercules, (N. U. R.) Vinsol resin in the form of a 5 percent solution is added at the mixer to the extent of 14 to 15 oz. per 4-cu. yd. batch so as to bring the amount of air in the concrete up to requirements.

A 30-ton capacity Vogt ice machine in combination with a Viltor unit supplies ice for the concrete and the amount used is such as to keep the concrete in the 70 deg. F. range. At the time of inspection, early in November, when weather conditions were on the cold side, some 100 lb. of ice per 4-cu. yd. batch were being added at the mixers. The concrete is placed from a sky-line using 8-cu. yd. Blaw-Knox and Garbro buckets. Some of this placing equipment was in service in the construction of Shasta dam in California.

The laboratory of the U. S. Army Engineers is located near the batching plant and features a 300,000-pound capacity Southwark-Emery, Baldwin Southwark Division, compression test unit and a "Streamliner" diamond saw that was supplied by the Hyatt Lapidary Equipment Co., San Diego, Calif. This circular saw operates in an oil bath and will cut a 10-in. dia. concrete core in about 20 minutes. The

Stacker belt conveyors finger out over reclaiming tunnels

Surge pile, right, feeds gyratory crusher, center

oil used is a 50-50 mixture of coal oil and No. 20 lubricating oil.

Ten-inch diameter cores are cut from the dam structure from time to time and these are then trimmed so the ends are parallel and capped with plaster of Paris caps for testing in the compression machine. The 10-in. dia. cores are required as it will be recalled that the top size aggregate in the core is large: 6 in. The cores are kept submerged in water in a shallow concrete sump in the laboratory proper.

Compressed air for use in and about the whole operation is supplied by the Gardner-Denver compressors and each is driven by Electric Machinery synchronous motors. One of the compressors is rated at 1700 c.f.m. and the other is a 2000 c.f.m. unit. They are driven by 200- and 250-hp. motors respectively. The compressor room also features an E.M. switch board.

The accompanying flow diagram will give the essentials of the flow of material through the plant at Mt. Morris. The tabulated data will supply added information not included in the flow diagram. The plant uses belt conveyors throughout. These were supplied by the Jeffrey Mfg. Co. and Barber-Greene Co.

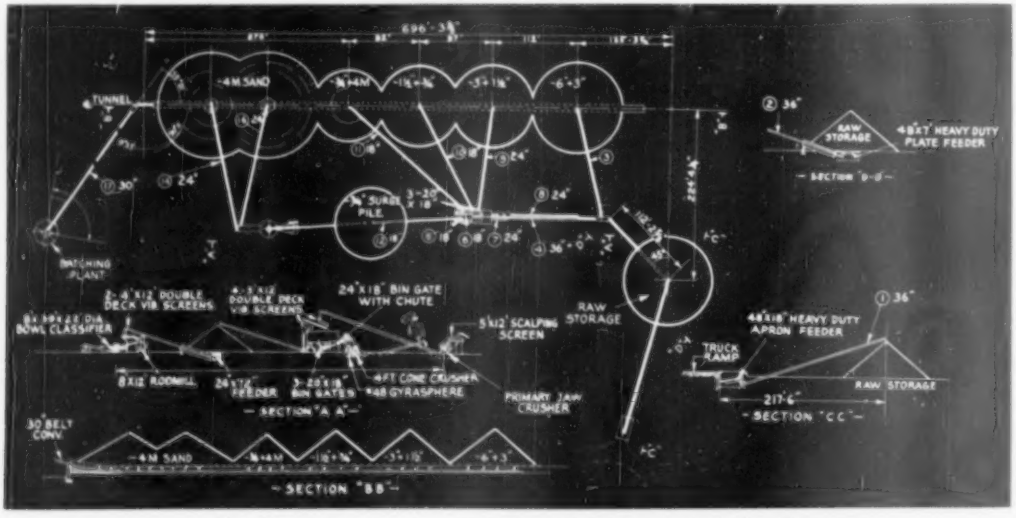
Limestone Plant Dissolves

McAndrews Limestone Products Co., Vinton, Iowa, has sold its interests to a new company to be known as the Benton County Concrete Products Co., Inc., owned by Frank Baird and Dr. W. D. Martin. The new company will continue the manufacture and sale of agricultural limestone, sand and gravel.

Name and Location	Supplied by	HP
Scalper screen, 5- x 12-ft., double-deck	Telsmith	15
16-B primary crusher	Telsmith	75
Four, 5- x 12-ft., F-600 vib. screens	W. S. Tyler Co.	7½ ea
4-ft. cone crusher	Nordberg Mfg. Co.	200
48-in. Gyrasphere	Telsmith	180
Rod Mill	Mine & Smelter Supply Co.	500
Bowl Classifier	The Dorr Co.	18
2, 4 x 12-ft. double-deck Vibro Kings	Telsmith	7½ ea
1, 5- x 12-ft. double-deck rinsing screen	Telsmith	15

Conveyor Belt Data

Belt No.	Width	Length	Hp.	T.p.h. capacity
1.	36-in.	198-ft.	50	500—to surge pile
2.	36	107	25	350—from surge pile
3.	30	145', 6"	15	150 Cobble stacker belt
4.	36	176	50	575—from primary crusher
5.	18	53	5	150
6.	18	93	5	150
7.	24	209', 6"	5	100
8.	24	105', 6"	15	225
9.	24	142', 6"	15	200 Stacker belt for minus 3 in.
10.	18	157', 6"	15	150 Stacker belt for minus 1½ in.
11.	18	205', 6"	10	100 Stacker belt for minus ⅝ in.
12.	18	117', 6"	10	100 Stacker belt for minus No. 4
13.	18	119	20	180
14.	24	171', 6"	15	150 Sand stacker belt
15.	24	171', 6"	15	150 Sand stacker belt
16.	30	614	30	600 Reclaiming belt
17.	30	293	40	600 Crossbelt to batcher

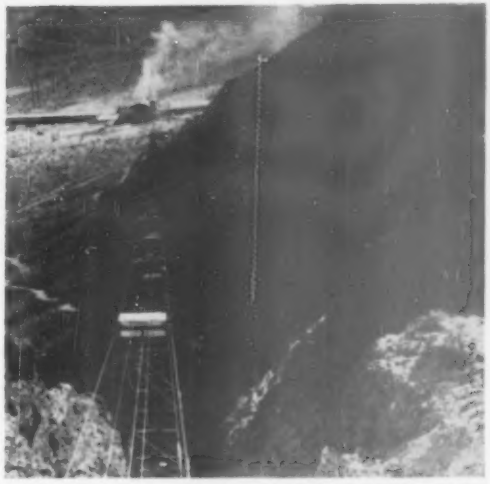


Flow sheet of final crushing and screening plant located at Mt. Morris dam site

Manufacture of Gypsum Plaster and Wallboard

Blue Diamond Corp. has increased mill capacity; adopted new development of split-second blasting underground and converted to mine loaders and large haulage units at Blue Diamond, Nev.

By BROR NORDBERG



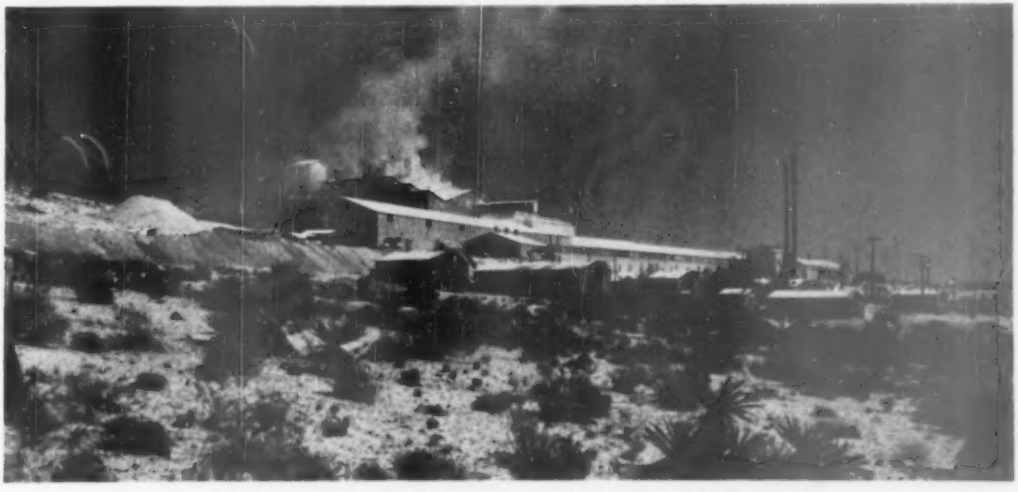
Automatic tramway delivers crushed gypsum rock to mill 900 ft. below

AT BLUE DIAMOND, Nev., from where a wide variety of gypsum products is shipped into the southern California market, the plant of Blue Diamond Corp. has undergone great expansion typical of what has taken place throughout the gypsum industry. Substantial enlargement of production facilities, considered herein, was completed in 1947, reflecting unprecedented demands for all varieties of plaster, lath and wallboard.

Blue Diamond is a "company town," 23 miles southwest of Las Vegas, and was established in 1941 at the time the corporation built the original plant at this location. Before that time, gypsum rock had been shipped from Nevada into Los Angeles for processing there. The town is an attractive little "oasis" in otherwise desolate country and has modern homes for operating heads and key personnel that would do credit to any home community, let alone one that stands in a desert and is encircled by impenetrable mountains. Location is in the foothills of the Spring Mountains, very close to the mountain peak on which movie actress Carole Lombard lost her life in an airplane crash that was given wide publicity. On a clear day, part of the wreckage of the plane can still be seen near the peak from the plant.

Blue Diamond is on a spur to the main line of the Union Pacific railroad between Salt Lake City, Utah, and Los Angeles, Calif. It gets its electrical power from Boulder Dam and its water supply from company-driven wells. The plant location, of course, was determined by the availability of high grade gypsum deposits which yield rock that is productive of high grade plasters and other products.

Gypsum lath and plasters are the principal products, and the list includes casting plaster, perforated and unperforated lath, aluminum foil back lath, wallboard, fibered and unfibered hardwall, plaster of Paris, dental plaster, gaging plaster, agricultural



General view showing wallboard plant in foreground and plaster mill in background

1: Slushers like this are used for opening mine portals. 2: Shuttle car emerging from one of mine entrances enroute to elevating conveyor. 3: Shuttle car unloading to conveyor which loads 15-ton trucks for delivery to crushing plant

gypsum and portland cement retarder. Capacity of the plaster mill was increased by one-third and that of the wallboard plant by more than one-half upon completion of the expansion program in 1947. All phases of production, including the mining and quarrying of gypsum and its transportation were expanded to conform with increased output from the plant. The mine operates on an 8-hr. basis—other divisions, around the clock.

The relation of the plant with respect to the deposits under work presents rather unusual transportation problems, since the excavations are on top and into a hillside adjoining the plant site below. Transportation involves a truck haul of about one mile down a grade averaging five or six percent to a crushing plant, followed by belt conveyor delivery to a dispatching station for an automatic tramway. The stone is then dropped 900 ft. in 3700 ft. of tramway travel to the plant.

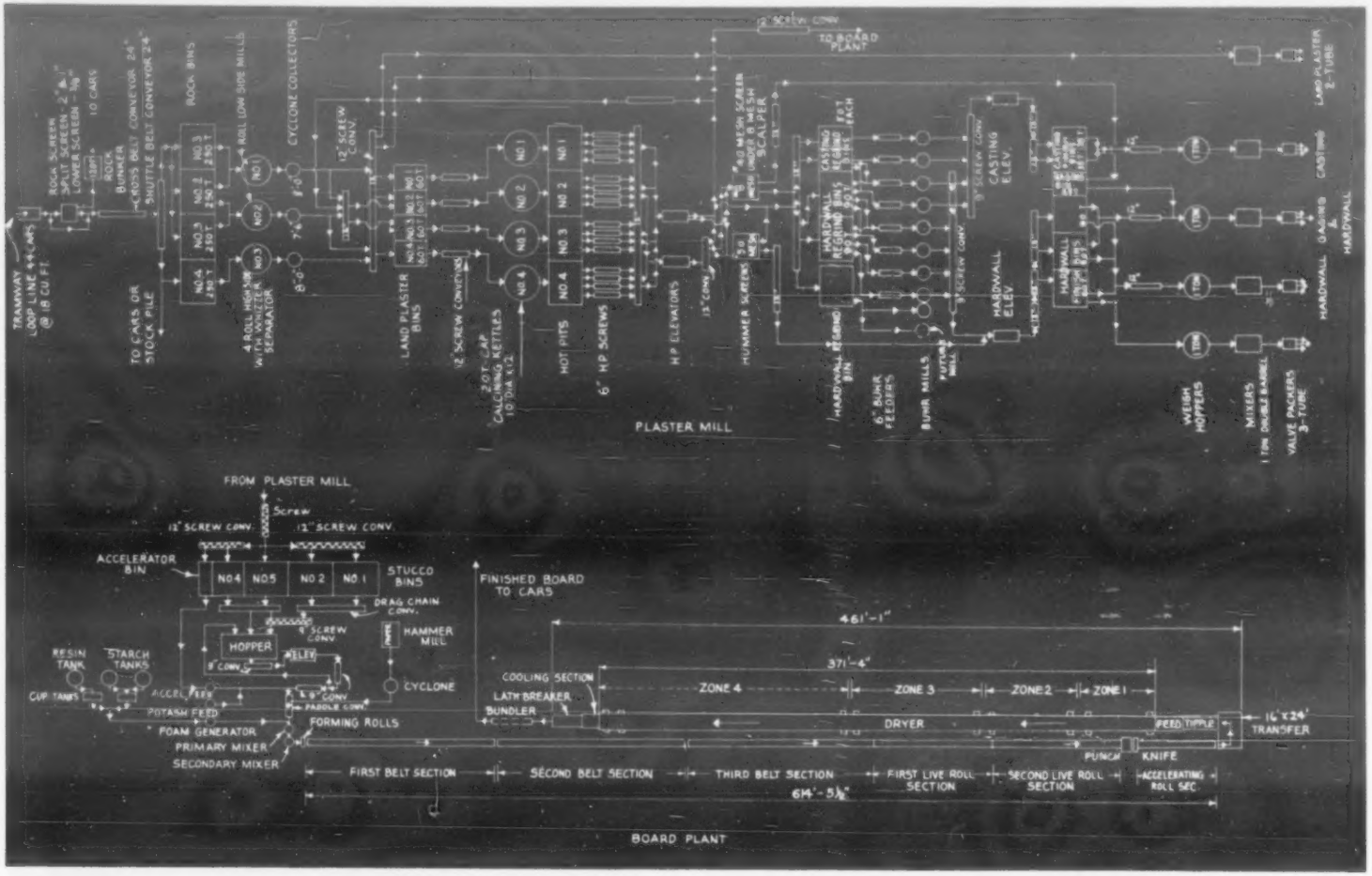
The Deposit

Gypsum rock is excavated by a combination of underground mining and open quarrying, and several strata are being worked. The ore bodies are classified as the erosion remnants of extensive gypsum deposits and occur at definite levels and are roughly horizontal. Two strata, approximately 16 ft. in height, are being mined underground and two levels are being excavated by open quarry methods utilizing power shovels. Because the strata are shallow, operations are extensive and new portals are being opened constantly. The gypsum beds outcrop on the hillside so it is a simple matter to locate new workings and follow the veins. Conventional room-and-pillar methods are practiced underground. Open pit quarrying is employed until stripping becomes sufficient to dictate going underground, and the bulk of high grade gypsum is from the underground workings. The various ledges under work vary somewhat in purity so that the extent of excavation from either is dictated according to the products being manufactured at a given time.

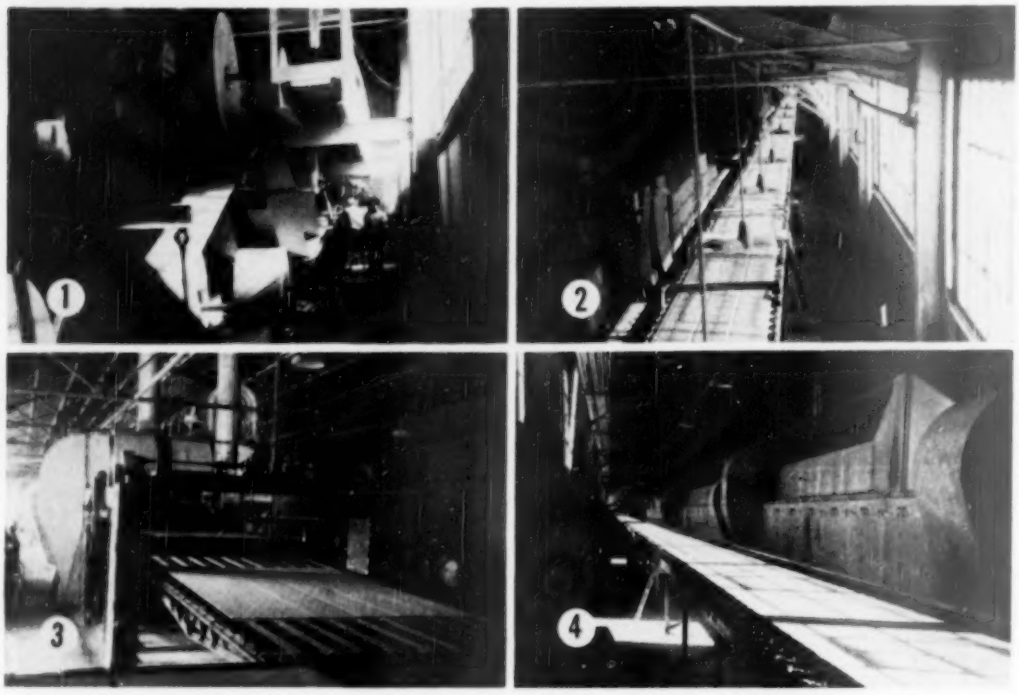
Until the expansion program was undertaken, 10-12 hr. of mining were required to keep the plaster mill supplied for 24-hr. operation. Slushers were used to a great extent for loading cars on narrow gauge rail which were hauled by diesel locomotive to the tramway dispatching tower. Since 1947 rail haulage has been abandoned in favor of trucks. Slushers are now limited to the opening of portals, then to be followed by a Joy loader and shuttle cars which makes for a very flexible operation.

Drilling and Blasting

Gypsum rock in these deposits is on the soft side, with a hardness probably about 2(Moh's scale), and lends itself well to the use of auger-type



Above: Flowsheet of plaster mill to which additions were made to increase production by one-third. Below: Plan of wallboard plant which has had conveyor and dryer greatly extended in length and conveyors speeded up to increase fabrication and drying capacity by 50 percent



(1) View of paper-feeding mechanism for manufacture of wallboard and lath. Wallboard conveyor is in background. (2) Additional view of wallboard conveyor (dryer is on left). (3) Punched gypsum lath being fed into steam dryer. (4) View of wallboard conveyor, looking toward feed end. Steam dryer is on right

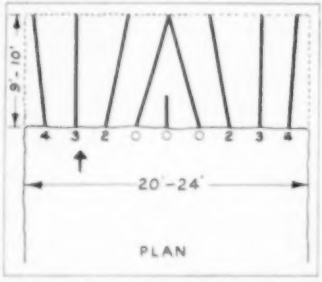
drills. This type of equipment has superseded the use of 55-lb. jackhammers with detachable bits and has been found handier and lighter in this kind of service. One advantage is that no airlines or compressors are required.

The drills are Jeffrey A-6 electric drills and the bits are Kenmetal tungsten carbide detachable bits with two cutting edges. They drill a hole which starts at 1⅞-in. dia., with small loss of gauge at the far end. Holes are drilled at the rate of 2 f.p.m. in side drilling. Compared with jackhammers and detachable bits, the speed of sinking holes is four times faster for horizontal drilling and twice as fast for vertical holes. Cutting edges are sharpened every other day and life of the bits is 30 days.

The open V cut pattern of drilling is followed, as illustrated herewith, and the Atlas Powder Co. Rockmaster "16" Blasting System of millisecond delay shooting has been recently adopted. Blast holes are driven to a depth (horizontal) of 8-9 ft. into faces 20-24 ft. wide and 12 to 15 ft. in height. An average shot will bring down 150-175 tons of stone, ready for loading without secondary shooting. As shown on the accompanying diagram, a typical shot consists of setting off 44 holes which are wired in series. Each is loaded with eighteen 1¼- x 8-in. cartridges and no stemming is required.

A slow ammonia-base powder, Amodyn 6-H, with a speed of 8500 f.p.m. is used in preference to the faster types because of the cushiony nature of the stone. An Amodyn 3-H powder serves as the primer.

The Rockmaster "16" Blasting System represents an extension in scope of the original Rockmaster system of split-second delay shooting for use in underground blasting, which provides more timing periods. Seventeen different timings including detonator No. 0



Drilling pattern for a typical, average shot underground. The ceiling height varies from 12 to 15 ft. Number of delays is indicated

followed by 16 detonators at spaced intervals provide a wide choice of delay intervals for adaption to various rock formations and conditions encountered. Just as in its predecessor, the original Rockmaster, each hole in a multiple-hole blast is fired at a controlled millisecond (thousandths of a second) interval before or after its adjacent hole, with the detonators substituted for instantaneous electric caps.

It will be noted from the sketch of the drilling pattern in use, that instantaneous detonators are used for relief at the center-line of the cut and that they are also used for the adjacent lines of holes (vertical) with the exception of the bottom holes. Skipping a period, in this way, allows the cut materials to be cleared from the face opened up. Then, on either side, No. 3 and No. 4 delays are used with the exceptions that No. 9 and No. 7 delays are alternated in the bottom holes and a No. 5 is used in the ceiling corner holes. This pattern has been found most effective thus far. No. 2 delays have an average delay time of 25 milliseconds after zero (0 detonators). No. 3 is 50 milliseconds after 0, No. 4 is 75, No. 5 is 100, No. 7 is 150 and No. 9 is 200 milliseconds. The detonators available in the system are timed 25 milliseconds apart

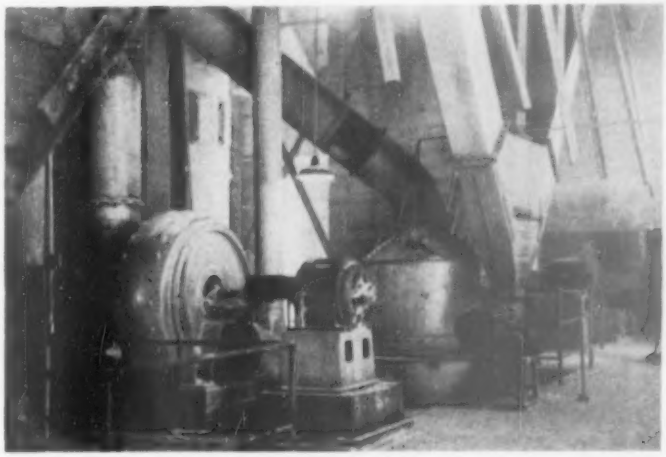
after the No. 1 delays (8 milliseconds) up to and including No. 9 delay, after which the intervals are 50 milliseconds up to 550 for No. 16 delay.

Use of the "16" blasting system is still new at this mine, but substantial savings in blasting powder are anticipated based on experience thus far, along with improved breakage and the other advantages associated with split-second delay shooting. Powder consumption has already been reduced substantially.

Excavation

A combination of an 18 HR Joy loader with two Joy 60-E shuttle cars and an elevating conveyor, also Joy, for transfer of stone into dump trucks, has materially increased the output of stone from the underground workings and its rate of delivery to the crushing plant. The loader is Caterpillar-mounted, powered by a 50-hp., 440-volt electric motor which drives the gathering head and supplies the tractive power as well. Two 7½-hp. electric motors, one on each side, drive the conveyors, which discharge stone at the rate of 12 tons in 2 minutes into the shuttle car. The controls are hydraulic. Maximum loading height is 8 ft. 10 in. above the floor and the loader is maneuverable with a swing of 45 deg. from center on either side.

Shuttle cars are driven from d.c. electric motors, furnished 250-volt power by cable and reel from a Reliance 40 kw. portable motor-generator set. They are rubber-tired and two 10-hp. motors provide tractive power. The conveyor motor is 10 hp. Transfer is from the shuttle car to the elevating conveyor, which is essentially a chain drag powered by a 20-hp. motor. It loads the stone into Euclid end-dump trucks for delivery downgrade to the crushing plant. The loader, shuttle cars and elevating conveyor are equipped with Mines Equipment Co. circuit breakers.



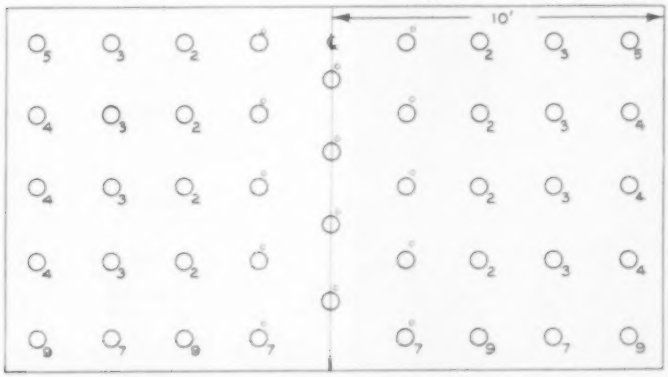
Three mills with cyclone collectors grind rock for calciner feed

Production of the plant requires that an average of 800 tons of gypsum rock be delivered to the plaster mill in 8 hr. When the trucks are being supplied without interruption, two trucks can deliver sufficient stone to the tramway to supply 960 tons of stone to the mill in 8 hr. The haulage units are powered by 150-hp. Cummins diesel engines and have a capacity rating of 15 tons.

Originally, three trucks were in service, hauling an average of 12 tons to the load, due to the steep downgrade which is as much as ten percent in places and averages 5-6 percent over a distance of one mile. Speeds necessarily had to be limited for reasons of safety and in order to conserve brakes and to minimize the wear and tear on engines when the trucks were geared so that the engines could be used to help hold down speed.

Profiting from the successful experience by the mining industry in the West with the use of independent hydraulic brakes on truck equipment, each truck was equipped with Hydrotarder auxiliary hydraulic brakes. These brakes, which are manufactured by Parkersburg Rig and Reel Co., Parkersburg, W. Va., are specially designed for the control of speed on long or steep grades. They are mounted on the drive shaft behind the transmission and receive their water supply from a large tank or reservoir mounted above the cab, and function independently of the mechanical brakes. Any desired rate of speed can be maintained through use of a control rod on the dashboard, without requiring application of the regular brakes or drag on the engine to slow a truck.

Thus, by permitting greater travel speeds with safety, each truck hauls 18 tons to a load and two units deliver as much stone as three did, in hauling reduced loads at slower speeds. The third truck is now a standby. Other advantages are greatly reduced maintenance of brakes and engines.



An average drilling pattern showing representative blasting delays (by number) as wired in series. This drawing shows a face in typical heading

Crushing

Stone is dumped into a steep hillside hopper from which a Sheridan grizzly feeder regulates the flow to a heavy-duty Gruendler 6XB hammermill which has 31¼- x 42-in. feed opening and is set to produce a minus 2-in. product. Fines by-pass the hammermill on to a belt conveyor below, which also carries the mill discharge to a single-deck scalping screen with 2-in. square mesh openings. Oversize is returned to the hammermill over a belt conveyor.

Minus 2-in. product is conveyed to the tramway dispatch station, transferring on to a two-way overhead reversible belt conveyor from which stone may be discharged into either

(Continued on page 166)

New building at College Park, Md., on University of Maryland campus that houses research laboratory of N.S.G.A. and N.R.M.C.A.

New Laboratory Facilities for Sand and Gravel, Ready-Mixed Concrete Associations

N.S.G.A. and N.R.M.C.A. equipped for expanding research program. Accelerated freezing and thawing equipment newly added for research on durability

WITH THE COMPLETION of a major portion of the building program for the Glenn L. Martin College of Engineering and Aeronautical Sciences at the University of Maryland, College Park, Md., the joint laboratory of the National Sand and Gravel Association and the National Ready Mixed Concrete Association moved into new quarters in June. Since then much new equipment has been added to carry forward the research program authorized last February by the Boards of Directors of the two associations. The new quarters are located in the Engineering Laboratory building. College Park is about ten miles from the heart of downtown Washington, D. C.

Every effort has been made to make the joint laboratory as complete as possible for keeping abreast of the latest developments in the technology of concrete and aggregates. One of the most recent acquisitions is a fully automatic freezing and thawing unit. While its construction was suggested by the automatic unit first developed by the U. S. Corps of Engineers, it differs from that one in that freezing is in air rather than in water.

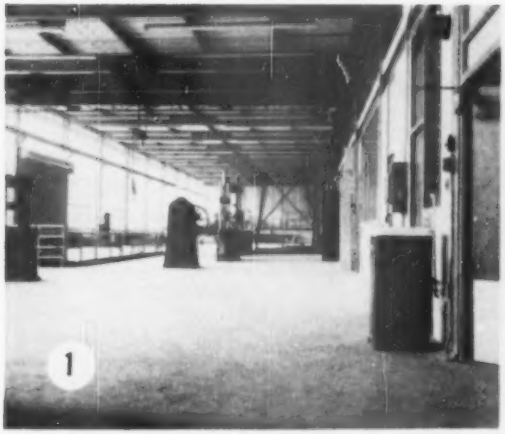
Laboratory staff (left to right): D. L. Bloem; James F. Shook, Jr.; James Hearn, Stanton Walker, director of engineering; E. J. Zeigler and W. G. Mullen

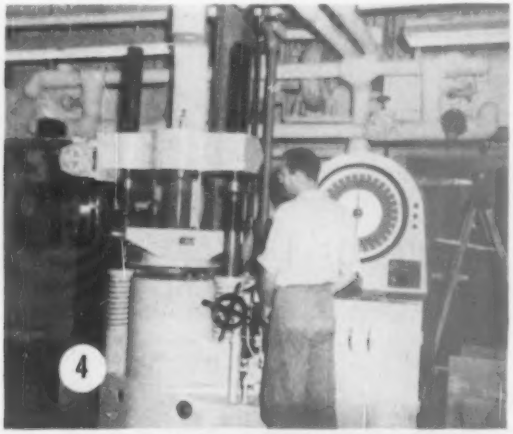
This equipment was manufactured by the Carrier Division of the United Clay Products Co. to specifications prepared by the associations' engineering staff. It has a capacity of 50 specimens, 3 x 4 x 16 in. in size. Specimens of other sizes may be tested also. Two fans keep the air circulating during the freezing cycle to maintain uniformity in temperature throughout the cabinet. Mounted below the main cabinet is the thawing water tank from which water is pumped through the specimen chamber at automatically controlled intervals. The number of cycles per 24 hr., at the time of our inspection of the new laboratory, had not been fully determined but it was indicated that as many as 8 cycles, and perhaps more, could be run.

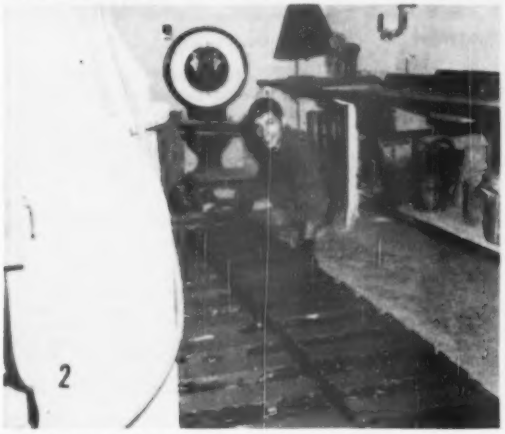
The laboratory staff also has designed and has built special equipment for studying thermal characteristics of aggregates and concrete by heating and cooling and wetting and drying. This consists of two thermostatically controlled tanks, one heated and the other refrigerated, in which concrete specimens may be alternately heated or cooled in either air or water.

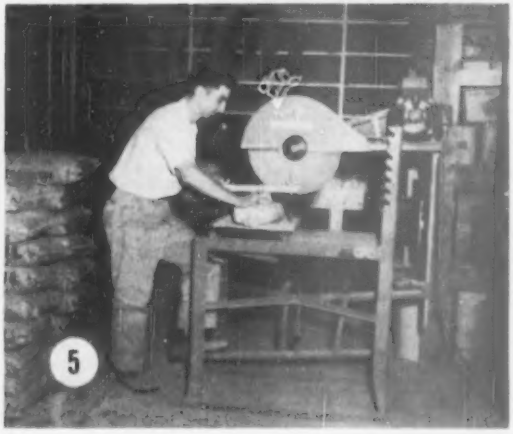
The new laboratory also features a moist-curing room in which the humidity and temperatures are auto-

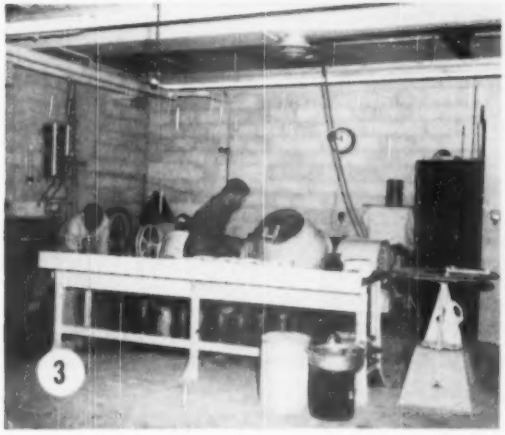
(Continued on page 174)

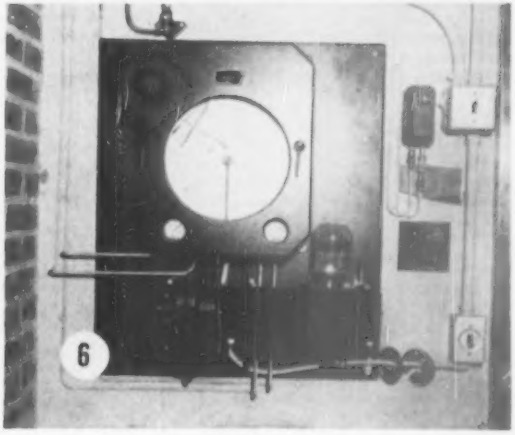












(1) General view of part of physical testing laboratory. (2) Molding concrete test specimens and apparently enjoying his work, is W. G. Mullen. (3) Corner of laboratory showing water still; 200-lb. capacity scale; 1-cu. ft. concrete mixer; 3½-sack concrete mixer; and flow table for concrete. (4) Recently modernized testing machine of 150-ton capacity. (5) Operating saw equipment. (6) Control apparatus

George D. Schounoman, manager, American Materials Corp. slag plant, center, explaining high lights of new plant to visitors

Diversified program of National Slag Association convention considers freight rates, markets, percentage depletion, air-entrainment and properties of slags for specific uses

Slag Producers Discuss New Uses

THE NATIONAL SLAG ASSOCIATION held its 32nd annual meeting at the Netherland Plaza Hotel, Cincinnati, Ohio, on November 29 and 30. The meeting was well attended, with approximately 40 registered, and some 20 producer companies represented. The National Slag Association is a relatively small group numerically but its membership embraces about 80 percent of the slag tonnage produced which, in 1949, totaled over 18 million tons.

The meeting was a two-day affair with the afternoon of the last day being devoted to a field trip at which time the association was guest of the American Materials Corp. which showed the members through the new slag plant near Hamilton, Ohio. This plant was described in the May, 1949, issue of ROCK PRODUCTS. (p. 63-66).

The morning session of the first day was presided over by E. L. Flad, president of the National Slag Association. After a brief address of welcome by Mr. Flad, Fred Hubbard, director of research for the association, spoke briefly on some of the work that had been done on air-cooled slag vs. chilled slag. He brought out that acid slags foamed best when used for preparation of a lightweight aggregate and that it had been practice in some cases to add silica at the ladle, thus increasing the acid properties of the slag. C. A. Barinowski, Birmingham Slag Co., told of improving the properties of slag for aggregate by quick chilling. This was accomplished by spreading the slag at the pits into thinner layers. No change was made in the fluxes making up the slag, he said. By chilling faster, the density was improved as well as the resistance to abrasion. J. R. Callanan, Callanan Slag & Materials Co., asked if the improvement was appreciable and it developed that the increases were in the 6 to 10 percent range. It also developed during the talk that slag for black top work was productive of good performance reports.

E. W. Bauman, managing director and secretary of the National Slag Association, next gave his annual report at which time he reviewed the status of the association. He told of the successful distribution of the "Slag Book" and told of the association's success in getting the United States Bureau of Mines to include a separate chapter of annual statistics relating to slag as one of the chapters in the annual yearbook. This procedure has been followed, the speaker said, starting with the year 1947. The statistics have proved valuable in connection with the association's appearances before the I.C.C., as well as before the Congressional Committee on percentage depletion.

The speaker told of the association's successful attempt to compile year by year production figures and presented data as compiled. Mr. Bauman not only gave the yearly production figures but also gave the sources of this information which were as shown below.

On the subject of percentage depletion, it is indicated that while the bill before Congress did not pass, the matter is not closed and that it probably will come up again at future sessions.

C. A. Barinowski, in a discussion on freight rates, thought it better for members to seek relief direct from the carriers rather than through some regulatory body, as it had been his recent experience that this was the most effective procedure. R. K. Plumb, American Steel & Wire Co., made his report on advertising and publicity;

(Continued on page 175)

ANNUAL SLAG PRODUCTION OVER 25-YEAR PERIOD

Year	Tons Slag Air-Cooled-Screened and Unscreened	
1924	8,000,000	
1925	8,000,000	ROCK PRODUCTS Magazine—taken from its records on industry production statistics
1926	10,000,000	
1927	10,000,000	
1928	9,462,823	
1929	9,621,778	
1930	9,045,039	Data presented before the I.C.C. in Ex Parte Proceedings 115, November 26, 1934. (See N.S.A. File 92-23.)
1931	6,494,758	
1932	4,207,479	
1933	3,200,000	
1934	4,578,925	
1935	4,593,019	Data developed by N.S.A. in 1949 through canvas of the industry by means of tonnage questionnaire.
1936	7,059,856	
1937	7,799,891	
1938	7,321,259	
1939	7,920,281	
1940	9,363,228	
1941	13,169,581	
1942	15,665,307	
1943	15,101,421	U. S. Bureau of Mines Minerals Yearbook
1944	11,506,915	
1945	11,834,464	
1946	14,929,853	
1947	17,160,945	
1948	18,260,123	

Plant visitors on field trip: (1) **New members: R. Newton McDowell, Gary Slag Corp.; E. C. Levy, E. C. Levy Co.; and Ralph Richards, Great Lakes Steel Corp.** (2) **C. E. Glander and V. L. Drake, both of American Materials Corp.; E. L. Flad, Carnegie-Illinois Steel Corp., president, N.S.A.; and A. W. Wood, Cleveland Slag Co.** (3) **H. M. Snyder, Buffalo Slag Co., newly elected member of the executive committee, left, and Guy C. Baker, American Materials Co. Mr. Baker's company was host for the field trip which inspected the new slag plant at Hamilton, Ohio. V. L. Drake, American Materials Corp., looks on.** (4) **W. E. McDermut, Chicago branch manager; R. W. Hopkins, president; and R. C. Pennington, of Columite Co., Hamilton.** (5) **W. E. Bliss, Standard Slag Co. and Geo. D. Scheunemon, American Materials Corp.** (6) **G. A. Mattison, Jr., past vice-president and member of the executive committee, N.S.A., representing Woodstock Slag Co., and E. H. Bauman, managing director of the association**

Aerial view of plant and quarry: kilns, lower left; and to right is new screening and storage plant for kiln feed

All phases of production, from quarry to re-design of kilns, have added to marked step up in production of lime at Beachville plant, Gypsum, Lime and Alabastine, Ltd.

Increasing Capacity Without Major Re-Building

By J. H. ROBINSON*

THE BEACHVILLE, Ontario, (Canada) deposit, of high calcium limestone, which geologically belongs to the Detroit river formation, has been quarried and the stone calcined since 1900. The property now owned and operated by Gypsum, Lime and Alabastine, Canada, Ltd., was purchased in 1929 from Beachville Lime and Stone, Ltd.

The practice of hand-loading stone for kilns, and for sale as metallurgical stone, was in effect up to the year 1931 but in that year this method was discontinued and mechanical loading and screening equipment installed. The general method of operation at this time is described below.

The overburden, which varied from 3 to 10 ft. in thickness, was removed by shovel and trucks and disposed of in an old abandoned quarry. Drilling was done by manila rope churn drills operating on a face averaging 30 ft. in depth. Blasting was done using 2 x 16 dynamite, 40 percent with electric blasting caps. Secondary breaking was by plug drills and ordinary fuse and cap blasting. Loading from the face was handled by a 50-B Bucyrus Erie 1½-cu. yd. electric shovel to Mack A. C. gasoline trucks equipped with Easton V-bottom side dump bodies. The trucks hauled approximately 7 to 10 tons of stone per trip to a 30-in. Superior McCully gyratory crusher. Stone was conveyed from the crusher by a 30-in. rubber belt to a surge bin of approximately 20 tons and then fed to an inclined bucket elevator manufactured by United Steel Corp. This elevator delivered the stone to a Dominion Road Machinery 7- x 20-ft. revolving screen. From this screen, four sizes of stone were delivered to stone bins below for gravity loading into railway cars, kiln charging cars or to trucks. The 4- to 10-in. size was fed into kilns; the other sizes, 2- to 4-in., ¾- to 2-in., ¾-in. to dust, were sold as commercial stone.

Lime was burned in ten hand-fired shaft kilns having fire boxes on each side of the kiln. They operated on a 4-hr. draw and the ten kilns produced 100 tons of lump lime per day. Ninety percent of this lime was loaded as lump lime direct to box cars by wheelbarrows. The balance was sold as pulverized lime and as hydrate.

In 1939, Canada's huge industrial expansion was just getting under way and the directors of the company

*General Superintendent, Gypsum, Lime & Alabastine, Canada, Ltd., Toronto, Ontario, Canada

This blast brought down about 10,000 ton of well fragmented rock. Plant may be seen, upper left

foresaw a big increase in the demand for the high grade lime produced in the Beachville plant. Under the direction of P. P. Tyler, managing director, plans were made to increase production facilities. In September of that year, two Azbe-designed kilns were built and brought into production, each with a daily production averaging between 50 and 60 tons. This more than doubled the production capacity of the plant and handling was greatly speeded up by the installation of mechanical conveying equipment to handle the lime from the draw pits of the new kilns direct to freight cars, storage bins or the hydrating plant.

In February, 1941, a shortage of natural gas developed so a Woods No. 10 automatic gas producer was installed, making the plant independent of fluctuations in the supply of natural gas. With installation of the gas producer, the two Azbe kilns were changed over to burn producer gas and a third kiln was erected.

During the next two years, considerable experimentation was done with the introduction of gas in the coolers, forced draft in the coolers to aid the top exhaust fans, elimination of side burners and recirculation of exhaust gases. These experiments led to several changes in the original kiln design and as a result the average daily production per kiln was raised to 70 tons.

The principal change was an increase in the thickness of brick lining by 4½ in. thus eliminating side burners. This had the effect of reducing the shaft area in the kiln and stepped up the velocity of the gases.

Apart from the important increase in daily production, these changes resulted in lengthening the operating period between repairs from 10,000 tons up to 20,000 and 22,000 tons per kiln.

Continuous mechanical drawing was tried. This had many advantages, such as more uniform lime and higher fuel ratio, but it was discontinued because of mechanical bridging in the kiln due to the size of the stone being calcined.

After several years of experience with the vertical kilns, and based on the result of many experiments, a new kiln was designed by company engineers and erected at Beachville in December, 1947. In this fourth kiln, the central brick flue was redesigned for better distribution of air and gases through the burning zone and it provided for the complete elimination of recirculating exhaust gases These changes resulted in a kiln producing 80 to 100 tons per day.

It was then found that one 10-ft. gas producer was unable to gasify sufficient coal to supply four kilns at this high rate of production. Consequently a second gas producer, a 10-ft. Wellman, was installed in September, 1948.

Additional control instruments were provided on the producer and a carefully worked out procedure was set up to enable the operators to control rigidly the uniformity, quantity and quality of the gas entering the kiln. By careful attention to this important factor, the lime-fuel ratio was raised from 5:1 to 5.5:1.

Five kilns, center, and hydrating plant, left

During the past ten years, as the quarry was extended, the depth of overburden encountered has increased from 10 up to 35 ft. Removal of the overburden is handled by contract, and is handled by Carryall scrapers or shovels and trucks.

Blasting Procedures

In 1947, an important improvement was made in methods of blasting. Two of the company's engineers, W. G. Smith and Terrence Rourke, developed a blast-hole timing machine (for which a patent has been applied), which stepped up the ratio of tons of rock per pound of dynamite from 3:1 to 5.3:1. This device made it possible to increase the diameter and the spacing of the drill holes and to use more efficient dynamite. Where formerly three old drills operated on 12- x 12-ft. spacing with 3½-in. holes, averaging 5 ft. per hr., the work is now accomplished by one drill, a caterpillar-mounted 22-T Bucyrus-Erie operating on 15- x 15-ft. spacing, averaging 10 ft. per hr. with a 5¼-in. dia. blast hole.

Very little secondary breaking is necessary now. Required secondary breaking is done by use of the drop ball, using a 3300-lb. ball on a No. 5 Northwest gasoline crane equipped with a 50-ft. boom. This method, which was started in 1939, showed a considerable saving over the previous practice of pop-hole blasting.

Haulage System

The transportation of rock from the quarry face to the crusher came in for its share of improvement to keep pace with developments of other operations. Prior to 1940, the haul was around 700 ft. and three small Mack Model A.C. trucks handled it nicely. By 1940 the length of haul had increased to 1500 ft. and these trucks were replaced by three Easton TR-10 13.5-ton semi-trailer units with Mack gasoline tractors.

During 1949 the gasoline tractors were replaced by Mack diesel units, hauling the same trailers; the distance now averages 2000 ft. These diesel units are operating at approximately one-quarter of the fuel cost of the previously used gasoline units.

Consumption of electric power throughout Ontario had by 1948 far outstripped the capacity of the public utilities to produce, and industry

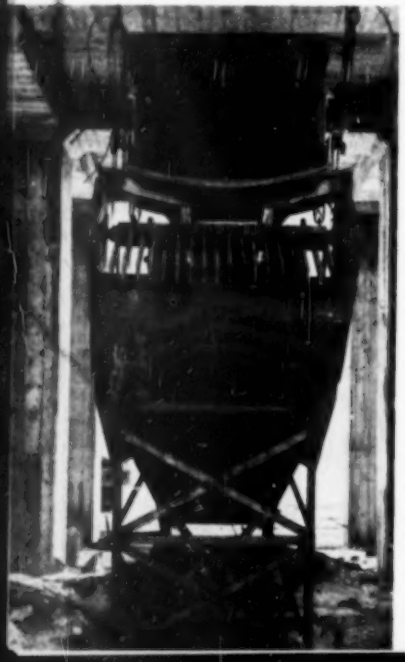
Screening plant erected over new concrete silos, left, and five kilns, right

Sorting lime on belt conveyor from lime cooler

generally was faced with the need to conserve electricity. At Beachville, in January, 1949, the 1½-cu. yd. electric shovel was therefore replaced with a 2½-cu. yd. 80-D Northwest diesel. The larger size was installed as part of the plan already underway to change the elevating and screening equipment so as to increase the production rate from 125 to 250 t.p.h. The quarry is illustrated in color on the front cover of this issue of ROCK PRODUCTS.

The bottle neck that limited hourly production was the handling of material from the crusher and putting it through the screening process. To correct the situation complete new conveying, screening, and storage equipment was designed, and is, at time of this writing, under construction. It is

Magnetic grizzly-feeder being installed under storage silos



expected to be in operation by January, 1950.

From the crusher, the belt conveyor delivers the stone to a surge bin. A cross conveyor belt takes it from the bin to the foot of an inclined belt which elevates it some 130 ft. to the screening plant built on top of the battery of seven concrete silos. The silos were constructed by MacDonald Engineering Co. of Toronto and Chicago, using the slip form method. The stone is graded by two 5- x 12-ft. and one 4- x 10-ft. double-deck Simplicity vibrating screens and gravity fed to the silos below. Three of the silos are 30 ft. in diameter with 1000 tons capacity. The other four are 22-ft. diameter and hold approximately 400 tons each. The three larger silos will be used for 2- to 4-in., 4- to 6-in. and 6- to 10-in. sizes. They provide stone for the kilns or can load directly into railway cars or trucks. The four smaller silos will handle 1-, ¾-, ½-in. sizes and screenings, respectively, making these sizes available for rail or truck shipment, and also providing stone for calcining should the demand for lime continue to increase.

Stone for the kilns will be taken from the bottom of the silos, with Syntron grizzly feeders to minimize degradation in silos before loading into the kiln cars.

Of the five kilns, two are being changed to handle better the 4- to 6-in. stone and two will handle the 6- to 10-in. stone. The fifth and newest kiln will be used to calcine the 2- to 4-in. stone. The 1000-ton silo provided for each of these sizes will permit continous operation of the kilns, including weekends, yet the quarry will operate on a 40-hr. week instead of 96 hr. as at present.

Several new controls are incorporated in the new fifth kiln, providing for continuous draw controlled by recorded temperatures in the upper sections. There also is volume control of secondary air introduced in the cooler. It is expected that this kiln will produce 150 t.p.d.

Other Improvements

In addition to the new kilns, a Beaumont Birch soot removal unit is being installed in conjunction with redesigned gas ducts, thus reducing by more than one-half the time loss previously experienced each week in blowing soot from gas ducts. Also being installed is a 500-ton cooling bin, with three separate compartments, for cooling the lime from the original kilns when operating at high capacity. This allows each compartment at least eight hours of cooling time prior to sorting and loading.

Some measure of the accomplishment of the renovation described above is shown by the comparison of production figures; the original shaft kilns (now abandoned) had an annual production of 20,000 to 30,000 tons. They have been replaced by this mod-

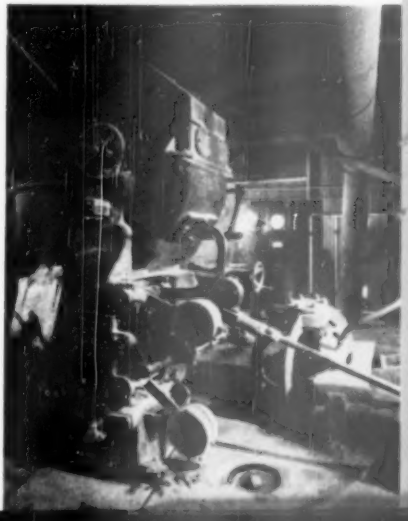
Churn drill rig that averages 10 ft. per hr. of 5½-in. dia. blast hole

ern plant with a potential capacity of 150,000 tons per year. Although wage rates have increased over 300 percent, and the price of coal about 140 percent, the selling price of lump lime has increased less than 10 percent above the 1929 price. This achievement has been made possible because of the company's policy of continuous improvement and development.

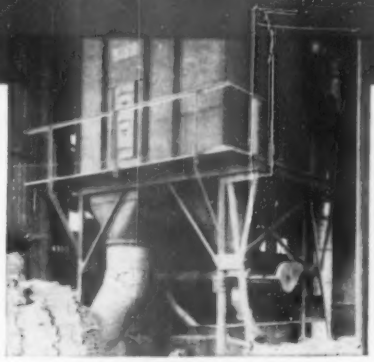
Plans and design of the stone equipment, including silos, was handled by R. M. Scrivener, consulting engineer, Toronto. Hamilton Bridge Co., Hamilton, Ont., fabricated and erected the steel work.

The Beachville plant is under the direction of R. S. Adams, plant manager; M. F. Parsons, lime plant superintendent; and W. H. Scherk, plant engineer. (An article in the October, 1939, issue of ROCK PRODUCTS covered some features of this plant, and illustrations showed the old kilns, the two original natural gas kilns and the original Mack A. C. trucks and shovel.)

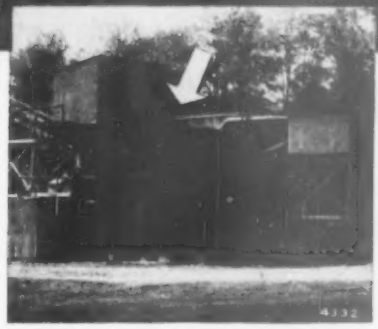
Gas producer installed in 1941 makes plant independent of natural gas supply fluctuations



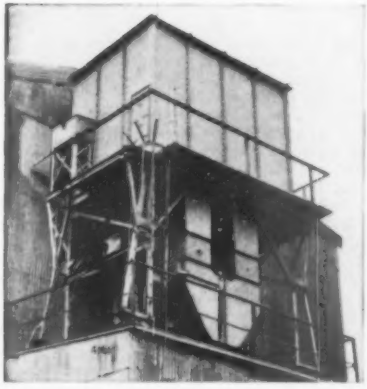
SLY PIONEERS AND LEADERS IN DUST CONTROL



Sly Dust Filter in a Cement Plant Bag House.



Sly Dust Filter in a Feldspar Quarry and Mill.



Continuous Sly Dust Filter on a Cement Plant Finish Mill.

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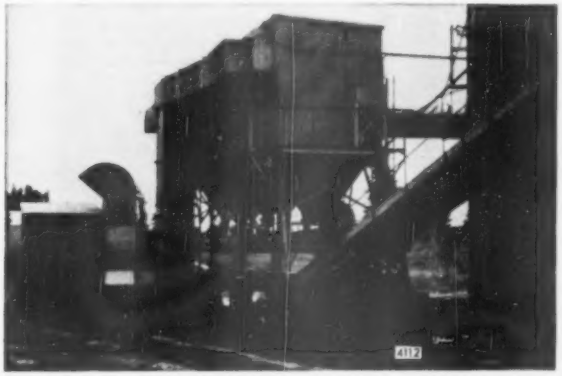
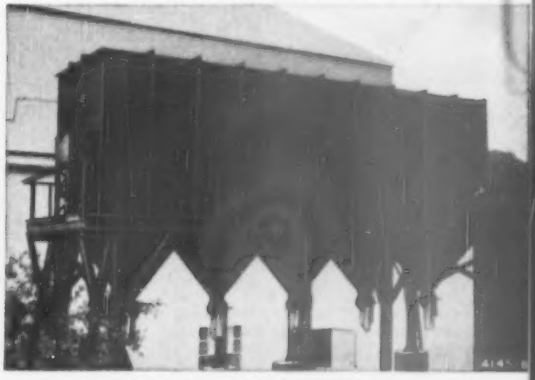
Sly units are not expensive; they save thousands of dollars yearly in plant maintenance and improved production.

One of several Sly Dust Filters on a Cement Plant Pack Hou



Sly Dust Filter connected with the Crushing Plant of a manufacturer of roofing granules.



Sly Dust Filter in a Rock Crushing Plant.

THE W. W. SLY MANUFACTURING CO.

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Experimentation

"Old Fashioned" Cements vs. Modern Cements

Kansas Test Road to determine whether old-type, coarser-ground cements of years ago may have favorable influence on durability of concrete

By W. J. ARNDT*

THERE ARE MANY straight thinking engineers, concrete experts and chemists who have carried the thought that the cements made during the 1920's were superior for some purposes to those which we are now using. It has been said that today's fine ground cements were too quick to hydrate; that they gained a high strength early in their life, but thereafter they did not gain further.

Perhaps we have refined the cement too much. Perhaps we have attempted to progress by insisting upon having a cement that would achieve a high strength early, but gave insufficient thought to the future ability of that concrete to maintain its strength. We may have assumed that our concrete, once attaining 4000 p.s.i., would maintain that strength forever. This is not the case apparently, particularly in slabs subjected to high fatigue factors, such as pavements.

We, as highway engineers, have relied upon specifications which covered the properties only up to 28 days. Our longtime durability tests have been mostly laboratory tests which apparently have not necessarily followed the same pattern as field performance in all cases. This is not to infer that all recent concrete pavements are bad. In fact we have many miles of good concrete pavements. However, we seem to be plagued with a disease of one form or other setting in on too much of our mileage when it is ten years young. Then serious maintenance costs begin to appear. Sometimes in as short a time as 15 years a complete reconstruction job is being considered. Could it be that many of our present day pavement diseases like alkali reaction, D-cracking, map cracking, or scaling are basically caused by age weakness in their binder, the cement? Could it be likely that these forces of expansive aggregates, etc., have always been present but did not manifest themselves because the mortar was of such continuous strength that such forces were successfully resisted? Certainly less attention was paid, in the early days, to the aggregate sources, the cleanliness of the aggregates and petrographic composition than the attention given these factors today. There was much less expert supervision then than now, yet generally concrete pavements constructed during that period, although structurally cracked, are by and large sounder than many of the concrete pavements built during the 1930's and even in the 1940's.

We engineers should be able to realize not less than 20 years of good service life from concrete pavements and it would be better still if we could get 30 years service without excessive maintenance or resurfacing. With the present aggregate, plus the specifications and with present day balanced design practices, no extraordinary troubles should develop with pavements, except in the few unusual conditions which are bound to appear now and then in spite of all that is done.

Mechanization of pavement laying has progressed immeasurably. There must be a way to enable the concrete, which these machines were designed to mix and lay, to exhibit the same degree of progress and efficiency. There has been much said and written about progress in concrete being made by the introduction of air entrainment. It is wholly possible that this is the answer, but, since this innovation is still an infant, can we be certain that air-entrained concrete will serve as efficiently as we know many of our older pavements have? In other words, the older pavements are outstanding examples of sound concrete. There is a remarkable absence of map cracking, D-line cracking, or other forms of disease in these older pavements. Even though structurally cracked, and such cracks are usually of considerable width since the use of wire mesh was not a customary practice, the impact of heavy trucks on the edges of these cracks has not done much damage. One very seldom sees these edges crushed or ravelled, but on the other hand they are quite often highly polished because of their toughness and hardness and resistance to impact. Can we reproduce such tough and hard concrete at the present time?

These thoughts were in the minds of Kansas engineers and highway users when the creation of a test road was conceived. It was proposed to construct a test road which contained concrete made with cement as nearly like the cement contained in the concrete laid in the 1920's as present manufacturing methods and equipment would permit. The State Highway Commission of Kansas and the U. S. Bureau of Public Roads were offered the cooperation of the Lone Star Cement Corp. to produce such cement at its Bonner Springs, Kan., plant. Lone Star agreed to manufacture a cement conforming to its chemical and physical analyses during the 1920's providing that certain construction practices which they believed to need correction were investigated at the same time. All three of these parties were primarily interested in constructing concrete pavements with greater longevity. With this single purpose, the plans for the project were carried forward speedily and with full agreement.

(Continued on page 152)

Concrete saw cutting contraction joints 1/8 x 2 in.

*Assistant Engineer of Materials, State Highway Commission of Kansas, Topeka, Kan.

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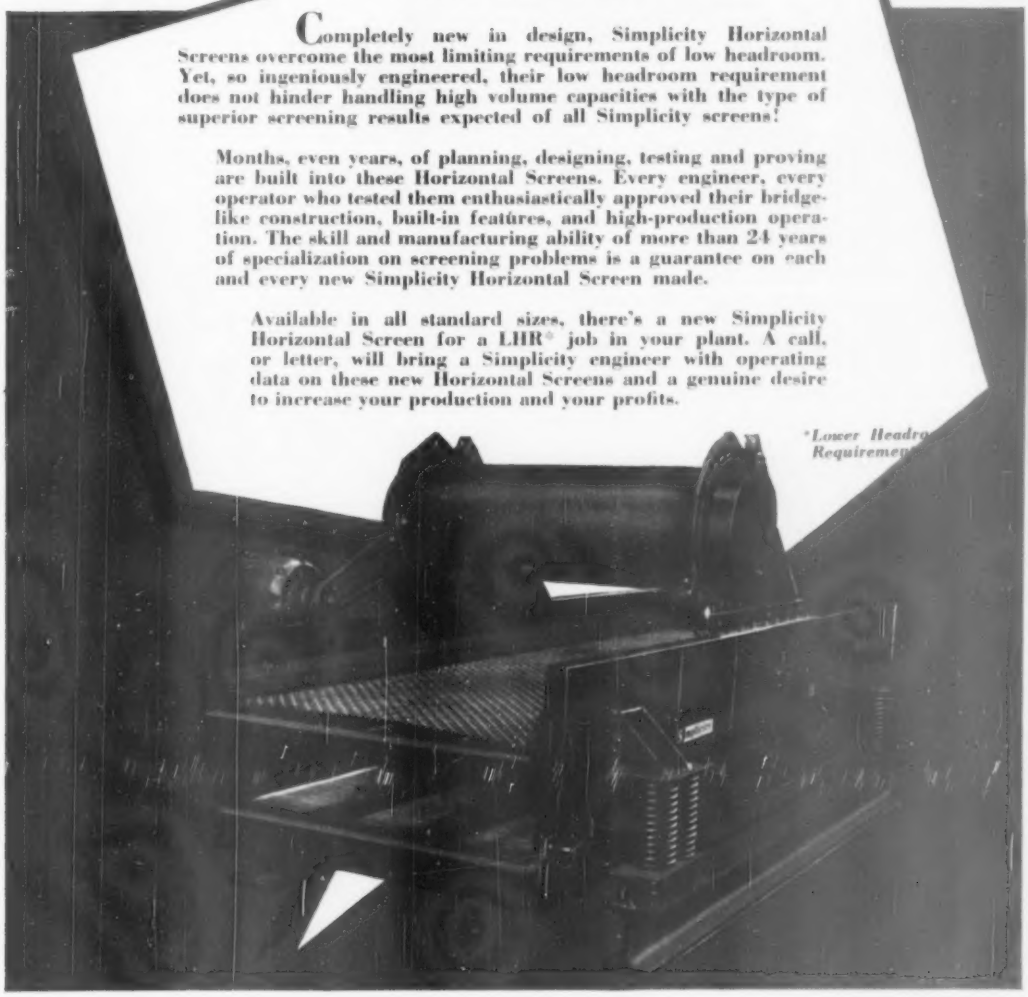

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See you at the Stevens! In Chicago, January 22-28, National Sand and Gravel Association, 34th Annual Convention and Exhibit.

The Kansas highway engineers designed the plans and wrote the specifications for this project with the aid of these organizations and their representatives: The Lone Star Cement Corp., represented by Myron Swayze, director of research, Mark Small, vice-president, Homer Griffith, chief chemist of the Bonner Springs plant; The U. S. Bureau of Public Roads represented by Frank Jackson, principal engineer, specializing in concrete, Clifford Shoemaker, division engineer, T. V. Bohnar, Division Materials Engineer; The Portland Cement Association represented by Wm. Lerch; and Kansas State College and the Portland Cement Association represented by Charles Scholer.

The site for the project was chosen on U. S. 75 immediately south of Topeka, Kansas. It was planned that this be a 4-lane highway, the southbound and north-bound dual lanes being separated by a 30-ft. median strip. The length was four-one-half miles. The terrain was slightly rolling and of a uniform character. The roadbed was composed wholly of calcareous clays; however, the immediate subbase beneath the 9-in. uniform pavement was 6 in. of a dense granular material.

The first step in the preparation of the specifications of this project was a review of the chemical and physical characteristics of cement as produced by the Bonner Springs plant each year from 1924 through 1948. This plant had excellent records on these characteristics.

These engineers also were curious to know if the differences in the 1920 concretes and the present day concretes were or were not wholly physical, so it was determined that there would be three cements used in various sections of this test road. There would be first, of course, the present day cement which was called "modern cement"; secondly, there would be the "old-fashioned" cement which would consist physically and chemically of the same properties of the 1920 cements. It was decided also that there would be a third cement which would be chemically the same as present day cements but would be ground to a coarseness the same as that of the "old-fashioned" cement. This cement would be designated as "modern-coarse ground." The specifications for each of the three types were thereafter written. In order that the reader may have a complete picture of these cements, these specifications are as follows:

Cement I (modern)

1. Regular grind shall be by closed circuit.
2. The maximum SO_3 content shall be between 2.0 percent and 2.5 percent with the actual content as near 2.25 percent as practicable.
3. The C_3S content of the cement shall be between 45 percent and 50 percent with the actual content being as near 48 percent as practicable.
4. The cement shall be ground by closed circuit grinding and the finished grind shall be between 1600 and 1800 sq. cm. per gram with an optimum of 1700 sq. cm. per gram.
5. The clinker shall be burned with gas as the fuel.

Cement II (old fashioned)

1. The cement shall possess a raw mix fineness of approximately 90 percent passing the 200-mesh sieve.
2. The clinker shall have a maximum free lime content of 1.5 percent.
3. Calcination shall be accomplished by burning units using 80-85 percent coal and 15-20 percent gas (B.t.u. Basis).
4. The processed cement shall have an SO_3 content of between 1.65 percent and 1.85 percent with the actual content as near 1.75 percent as practicable.
5. The cement shall be ground by open-circuit grinding and the finished grind shall possess between 18 percent and 22 percent residue retained on the 200-mesh sieve.
6. The C_3S content of the cement shall be between 35 percent and 42 percent with the actual content being as near 38 percent as practicable.

Cement III (modern-coarse ground)

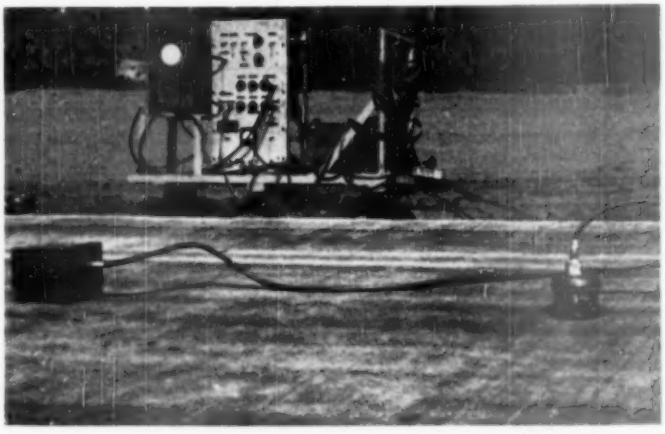
1. Grinding shall be by open-circuit grinding and the fineness of the finished grind shall be such that there shall be between 18 percent and 22 percent residue retained on the No. 200-mesh sieve.
2. The maximum SO_3 content shall be between 1.65 percent and 1.85 percent with the actual content as near 1.75 percent as practicable.
3. The quantities of other compounds shall be as near those of the modern cement as possible.

In manufacturing the three cements for this project, the Lone Star Cement Corp. found the basic differences between the modern cement and the "old fashioned" cement to be four-fold. First, the fineness of the raw material for the old type is coarser. Second, the lime content of the raw mix was reduced to an analysis comparable with what was obtained at Bonner Springs, 25 years ago. Third, burning temperatures in the kilns were reduced below normal modern temperatures and coal was used for fuel up to an amount of approximately 80 percent. Finally, the clinker was ground to a relatively coarse fineness with the addition of a smaller quantity of gypsum than is present practice.

Regarding the first item which is the fineness of the raw material, the present practice at Bonner Springs is to maintain a raw fineness of approximately 93.5-94 percent passing the 200-mesh sieve. For the production of the old type cement, this fineness was reduced to 90.2 percent passing the sieve, duplicating the practice of 1924-25.

The lime content of the raw mix before going to the kilrs in the modern cement was approximately 78.0 percent calcium carbonate. In the old type raw mix, this was reduced to 77.6 percent which on the surface does not appear to be much of a reduction. However, when it is considered that the modern cements were burned with gas whereas the old-type cement was burned with coal, the influence of the coal ash caused a considerable reduction in the quantity of lime in the clinker. In terms of tricalcium sili-

(Continued on page 154)



Soniscope: transmitter, right; receiver, left; spacing 4 ft. Scope in background

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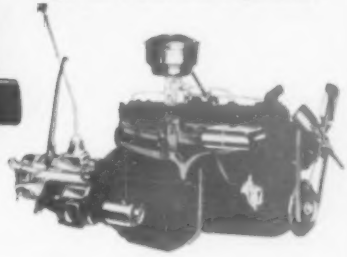

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cate, the modern cement has a 49.0 percent content whereas in the old type cement C_3S content averaged 37.8 percent.

The burning of the old type mixture was not greatly different than for modern clinker. However, it was noted that due to the low lime content the burning temperatures averaged approximately 100 deg. F. lower than is present practice. The more fusible mixture also accounts for a somewhat lower free lime content and slightly reduced loss on ignition.

The addition of gypsum to the old type cement and also to the modern coarse ground cement was reduced to yield an SO_3 content approximating 1.7 percent which represents a reduction of approximately ½ percent from the usual practice. In grinding both the modern coarse ground and the old type cement, open-circuit grinding was used instead of the present practice of closed-circuiting tube mills with air separators. The 200-mesh fineness of both cements was controlled as closely as possible to 20 percent retained on the sieve. This is in contrast to the 5-6 percent residue on the 200 for present practice. While this large increase in residue of the coarse ground cements would appear to represent a great reduction in fineness, nevertheless the surface area as determined by the Wagner Turbidimeter has shown no such proportionate decrease.

Perhaps the only other item which might need comment is in the matter of setting time. It will be noted that all three cements—"modern," "modern-course ground" and "old-fashioned" have almost identical initial and final sets. (This was not evidenced during construction.) In all probability this was due to the fact that the setting time pats were made up with the water required for normal consistency. With the modern cement this normal consistency averaged 23.3 percent, the modern coarse ground 22 percent, and the old fashioned cement 21.4 percent. This reduction in water for the coarser ground products naturally would reduce their setting times.

Since it was agreed at the original conference that certain points of the construction methods would be investigated on this project, it became necessary to write a separate set of specifications covering the finishing and curing methods which were to be used in this phase of the work. These new specifications were called the 1924 construction methods. The current specifications for curing and finishing concrete pavements were identified as the 1949 construction methods. The primary differences between these two methods consist of the following factors:

Cement Factor—The cement factor of the 1949 specifications was set at a minimum of 1.40 bbl. per cu. yd. The cement factor of the 1924 construction methods on the other hand was required to be a minimum of 1.60 bbl. per cu. yd.

Slump—The slump requirements of the two specifications were very similar, being about 1 in. to 2 in.

Proportions—The proportions of rock and sand were very similar under the two construction methods, being approximately 43 percent sand and 57 percent rock by volume.

Consolidation—The 1949 method of consolidating the concrete requires the use of an internal tube vibrator mounted on the front of the finishing machine. The 1924 methods prohibited the use of a vibrator and used nothing except the old time tamper between the front and rear screens. In addition to this, a steel roller weighing 100 lb. and having a diameter of 2 ft. was required immediately in front of the mechanical bullfloat. This roller travelled transversely across the slab and its purpose was to consolidate the top portion of the pavement and to remove laitance and bleeding water as it occurred.

Finishing—The 1949 construction methods required the finishing operations to be immediately close up behind the mixer with the least possible time elapse before curing. The 1924 construction methods, on the other hand, did not make it mandatory that these finishing operations be close behind the mixer and at times these operations were from 300 to 400 ft. back of the mixer due to the bleeding of the coarse cements. They *had* to be up close with the modern cement.

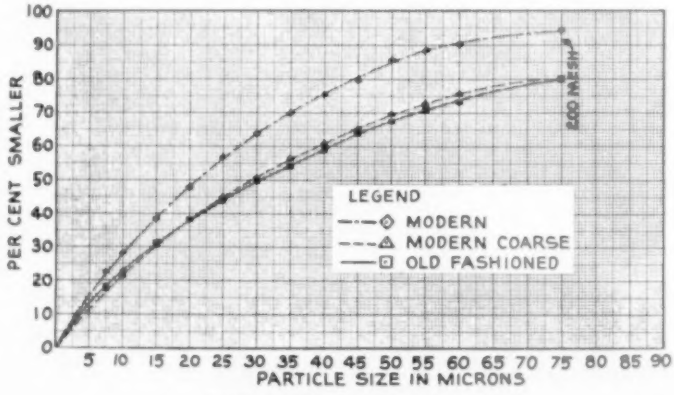
Curing — The 1949 construction methods permitted the use of transparent membrane curing solution to be applied at the rate of 100 sq. ft. per gal. This was to be applied as soon as the concrete had attained sufficient set to receive an impervious cover. The 1924 construction methods required the use of wet burlap to be placed on the slab as soon as it had become hard enough to receive it. This burlap was required to remain moist for the first 24 hr. after pouring and then to be removed and followed with 2- to 4-in. blanket of moist earth for 20 days from the pouring date. Traffic was not permitted on the pavement with 1924 curing for at least 10 days after the removal of the earth blanket.

These were the essential variables planned for this project. Eventually sections were incorporated in the project using 2-in. maximum size crushed stone alternately with 1-in. maximum size crushed stone. The State Highway Commission early in 1946 required all crushed stone for concrete to have a maximum 1-in. size in lieu of previous permission to use 1½-in. and 2-in. maximum size crushed stone. It was felt that the 1-in. maximum size would afford a sounder aggregate than the 2-in. size.

Other factors of this test project which are of interest were: (1) the expansion joints consist of redwood boards which are sealed with thermoplastic rubber at 500-ft. spacing; (2) The contraction joints are spaced at 20-ft. intervals. (Later in this article a new method of forming these contraction joints is described); (3) Wire mesh reinforcement was omitted. The only reinforcement designed for this pavement was a ⅜-in. round marginal bar, treated to destroy bond, placed 4 in. from the edge of the pavement; (4) The aggregates consisted of crushed limestone and fine siliceous river sand. (5) The pavement width is 22 ft.; (6) A 6-in. compacted granular subbase is continuous underneath the slab shoulder slope to shoulder slope.

The project contract was awarded to the Koss Construction Co. of Des Moines, Iowa. Construction of the pavement was started August 10th, of this year, and completed October 10th. At this writing (October, 1949) many of the 1924 sections are still under 20-day wet earth curing. No unusual construction difficulties were encountered on any of these sections; however, finishing and curing meth-

(Continued on page 156)



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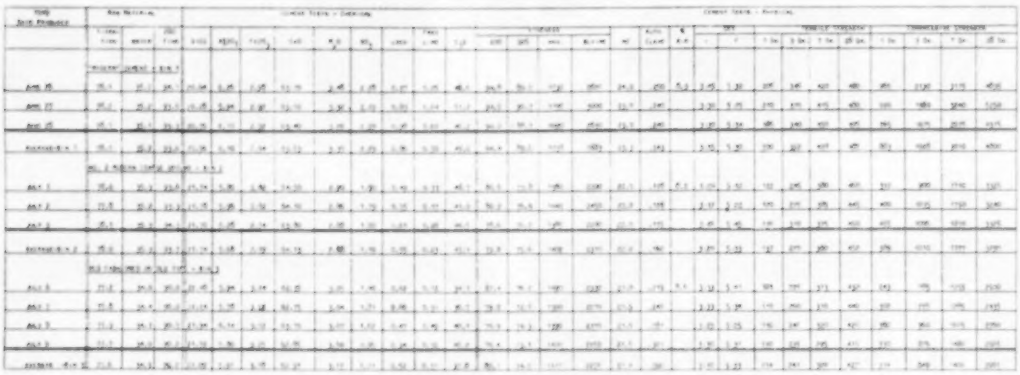

Cements Nos. 1, 2 and 3 produced by Lone Star Cement Corp. for Kansas State Highway project

ods were affected by the fact that the modern cement bled very little while both the old-fashioned cement and the coarse ground cement did bleed from two to three hours after they were placed.

All cement was produced at the Bonner Springs plant of the Lone Star Cement Corp. The crushed limestone was produced by the Loring Quarry at Loring, Kans. near Bonner Springs, and the fine aggregate was produced by the Victory Sand Co. from the Kaw river at Topeka. Typical analyses of the gradings of the 2-in. and 1-in. maximum size coarse aggregate were as follows:

Percent Retained on Square Mesh Sieves												
TYPE	2 in.	1½ in.	1 in.	¾ in.	⅜ in.	4	8	16	30	50	100	percent 200
2-in. max.	0	4	45	63	83	97	99	99	100	100	100	0
1-in. max.		0	3	37	88	97	99	99	99	100	100	0

Typical analyses for fine aggregate were:

Percent Retained on Square Mesh Sieves								
TYPE	⅜ in.	4	8	16	30	50	100	percent-200
Fine River Sand	0	2	8	23	46	84	98	0

Each section is approximately 1000 ft. long. Sections 1 through 16 are on the west dual lane on this north-south road and sections 17 through 26 are on the east travel lane. Traffic density and weights will be about equal on the north and south bound lanes.

Adjacent to each section and at the right-of-way edge, a test section 6-x 10-ft., containing separator plates, is constructed of the same concrete being used in that section so that twenty 6-ft. beams were formed and can be removed periodically for strength measurements. Smaller test specimens were made from each section for laboratory freezing and thawing tests. Then sonic modulus measurements are being made at the end of the various cycles of freezing and thawing. Eventual modulus of rupture results will be determined by the actual machine breaks.

Added interest has been created by the fortunate procurement of the new "Soniscope" apparatus with which an attempt will be made to evaluate the soundness of these various sections by an ultra-sonic method. This apparatus was developed in Canada by the Hydro-Electric Power Commission of Ontario. More recent description of it and the method was given by J. R. Leslie and W. J. Cheesman in the A.C.I. *Journal*, September, 1949, under the title "Ultra-Sonic Method of Studying Deterioration and Cracking in Concrete Structures." The State Highway Commission of Kansas and the Kansas State College were loaned this equipment by the Portland Cement Association. Each section will receive 10 sonic readings at the age of 28 days and each six months thereafter. From preliminary readings it seems possible that these readings together with the test section beams may serve together to allow an evaluation of these various concretes at an early age. Interesting data have already been obtained by sonically measuring the differences in the "setting up" processes of these concretes made from the three types of cement.

Section No.	Type Cement	Maximum Size of Coarse Aggregate Inches	Specifications for Finishing and Curing
1	Old Fashioned	1	1924
2	Old Fashioned	1	1949
3	Old Fashioned	2	1924
4	Old Fashioned	2	1949
5	Modern	2	1924
6	Modern	2	1949
7	Modern	1	1924
8	Modern	1	1949
9	Modern Coarse Ground	1	1924
10	Modern Coarse Ground	1	1949
11	Modern Coarse Ground	2	1924
12	Modern Coarse Ground	2	1949

Sections 13 thru 24—Round Two—Repetition of Round One
Sections 25 thru 36—Round Three—Second Repetition of Round One

Another innovation for this project has been the use of the concrete saw for cutting the contraction joints. The project began using the customary hand methods but with rather poor results. Unsound concrete adjacent to each joint resulted from troweling these joints with the concrete partially set. This condition was rather prevalent during the first mile of construction. Because of this, the concrete saw was given a try at the job on cutting these contraction joints. The saw was successful from the start and was continued through the remainder of the project. It is powered with a 17-hp. gasoline motor mounted on a rubber-tired, easily handled, two-wheel truck. A water tank also is mounted on this truck and it furnishes the coolerant for the 12-in. dia. saw blade. Each blade has many small commercial diamonds inserted in its periphery. The concrete saw has been used to cut the ⅛- x 2-in. groove as early as 8 hr. after pouring, but it is more successful after about 24 hr. and even better at an age of 20 days or more. The immediate advantages from the use of the saw are evident. The concrete adjacent to the joint is

(Continued on page 180)

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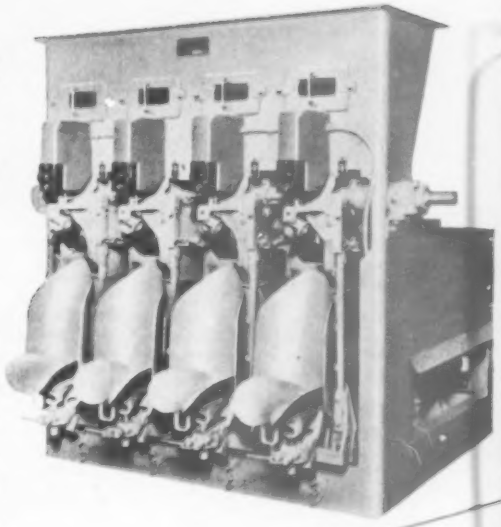

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CONVENTION PROGRAMS OF AGGREGATES INDUSTRIES

THE 34TH ANNUAL CONVENTION of the National Sand and Gravel Association and the 20th annual convention of the National Ready Mixed Concrete Association, together with the joint equipment exhibition to be held in the Stevens Hotel, Chicago, the week of January 23, promises to be the largest and most comprehensive ever held. It was found necessary to redesign the exhibit area in the Stevens to include the overflow of equipment to be displayed. Since this is the first postwar exhibit to be held since equipment has been available generally, the number of exhibitors has reached record-breaking proportions.

The full program will include a merchandising session on Thursday afternoon to be based on the information members submitted in response to an association letter asking for copies of promotional media used by the membership. A display will show advertising specialties such as pencils, slide rules, lighters, ash trays, calendars and hand-bills members use to promote their products.

The board of directors does not feel an annual dinner or banquet is advisable. However, the annual Manufacturers Reception on Tuesday evening, January 24, will hold considerable interest. Following is a condensed convention program schedule.

January 22

The executive committees of the associations will meet in the afternoon, N.S.G.A. at 2:30 and N.R.M.C.A. at 4:00.

January 23

A joint luncheon for the two boards of directors will be at 12:30. State and district association officials will also have a luncheon meeting at 12:30, in Dining Room 3. At 2:30 the N.R.M.C.A. board of directors will meet.

January 24

A joint meeting will be held at 10:00 a.m. Reports will be given by the association presidents, executive secretary, and director of engineering. Charles A. Horsky, counsel, will discuss "What the Wage and Hour Law May Mean to Our Industry." A luncheon at 12:30 will mark the annual meeting of the Manufacturers Division of the N.S.G.A. A luncheon for members of Ohio Ready Mixed Concrete Association will be held at the same time. The afternoon will be free to visit exhibits in the Stevens Hotel exhibition hall. A reception by associate members of the two associations will be in the Grand Ballroom from 6-7 p.m.

January 25

The morning session at 9:30 will be under the chairmanship of T. E. Popplewell. Ewan Clague, commissioner, Bureau of Labor Statistics, U. S. Department of Labor, will talk on "The Economic Climate in 1950." H. S. Fairbank, deputy commissioner, Bureau of Public Roads, U. S. Department of Commerce, will speak on "Highway Needs and Problems," and the subject of Leland Hazard, vice-president and general counsel, Pittsburgh Plate Glass Co., will be "Security and a National Labor Policy." A joint luncheon will be held at 12:30, followed by the afternoon session under the chairmanship of Harris N. Snyder. An address will be given by Samuel C. Hadden, chairman, State Highway Commission of Indiana, and former president of the American Association of State Highway Officials. Presentation of safety trophies also will take place during this session. In the N.S.G.A. contest, the large plant class winner is Texas Construction Material Co., The Dolen plant, Romayor, Texas. Small plant class winner is Pacific Coast Aggregates, Inc., Fair Oaks plant, Fair Oaks, Calif. Winners of the N.R.M.C.A. contest are Kuert Concrete, Inc., South Bend, Ind., in the large plant class, and Modahl and Scott, Inc., Bloomington, Ill. in the small plant class.

January 26

The morning session of N.R.M.C.A. opening at 9:00 will include talks by W. G. Kaiser, assistant director of promotion, Portland Cement Association, on "What Surveys Disclose to be the Existing and Prospective Markets for Ready Mixed Concrete," Charles Reene, advertising and publications bureau, Portland Cement Association, on "Use of Advertising and Direct Mail in Developing Ready Mixed Concrete Markets." A panel discussion on local programs for promoting the use of ready mixed concrete will be held with Robert C. Collins, general sales manager, Warner Company, as moderator. The panel will include Lee E. Kanck, assistant general manager, Fountain Sand and Gravel Co., R. P. Mumford, secretary, Beckley & Myers Co., and M. E. Sundt, vice-president and manager, Albuquerque Gravel Products Co.

The morning session of the N.S.G.A. will be devoted to merchandising problems and the afternoon session to a discussion of operating problems.

January 27

The morning session will begin at 9:30, when the N.S.G.A. will meet for the election of officers. Two talks will follow, the first by W. E. Hole, secretary-treasurer, American Aggregates Corp., on "The Sand and Gravel Industry Faces Problems of Zoning and Land Rehabilitation," and the second by Robert Mitchell, president, Consolidated Rock Products Co., whose subject will be "Reflections on Sand and Gravel and Ready Mixed Concrete Strike in Los Angeles." There will be a discussion by A. R. Shiely, vice-president, J. L. Shiely Co., and R. V. Warren, engineering representative, Western Pennsylvania Sand and Gravel Association. Kenneth B. Woods, professor of highway engineering and associate director, Joint Highway Research Project, Purdue University, will give an address during the session.

At 2:30 the N.R.M.C.A. will hold its closing afternoon session. Officers will be elected at that time. The subjects of laboratory research, lightweight aggregates, pretested materials and problems of standardization of truck mixers will be discussed.

Crushed Stone, Lime Institute Meetings

TIMELY SUBJECTS to be presented at the 23rd annual convention of the National Crushed Stone Association and the 5th annual convention of the Agricultural Limestone Institute, to be held jointly at the Stevens Hotel, Chicago, January 29—February 1, portend an important meeting. Social affairs will include a buffet dinner preceded by a cocktail party to be held at 6:00 p.m. Monday, January 30, and a banquet Wednesday evening. The Manufacturers Division will hold its annual luncheon business meeting on Tuesday, January 31. The N.C.S.A. will hold its meetings through Wednesday, when a joint session of the N.C.S.A. and A.L.I. will mark the opening of the latter organization's program. Following is the condensed program schedule.

January 29

There will be no open sessions the first day; meetings by the N.C.S.A. committees and board of directors will be held. Registration in the 3rd floor corridor will be held from 9:30-5:00 every day during the convention.

(Continued on page 160)

"Easiest to Change Cloth ...Has Largest Capacity"

THAT'S THE ENTHUSIASTIC statement of Mr. Gilman Carter, of Twin States Sand & Gravel Co., West Lebanon, N. H., about this 4 x 10 ft double deck *Ripl-Flo* screen.

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January 30

The morning session, beginning at 9:30, will be devoted principally to greetings from the president and a report on business conditions during 1949 and the outlook for 1950, and reports by the engineering director, field engineer and administrative director. Leland Stowe, European editor, *The Reporter Magazine*, New York, will give an address entitled "Billions of Dollars—And a Lot More Sense." The speaker at the luncheon meeting, to be held in the Boulevard Room (2nd floor), will be Dr. Kenneth McFarlan, superintendent of schools, Topeka, Kan., who will talk on "The 'U' in Business."

The afternoon meeting, at 2:30, will open with a talk "The Secondary Roads Program" by A. C. Leonard, chief, Secondary Roads Division, Bureau of Public Roads, U. S. Department of Commerce. John C. Gall, of Gall and Lane, Washington, D. C., will speak on "Federal Legislation Affecting Management - Labor Relationships." A third speech will be on "Significant Developments with Respect to Selling on a Delivered Price Basis." The evening will be devoted to the buffet dinner and an inspection of the equipment exposition.

January 31

The annual business meeting, consisting of committee reports and greeting from the president-elect, will take up the first part of the morning program. Two very important and timely speeches will follow: "Aggregates and Their Influence on the Durability of Concrete," to be given by Kenneth B. Woods, professor of highway engineering and associate director, Joint Highway Research Project, Purdue University, Lafayette, Ind., and "Report on Russia Today" by Robert Magidoff, former Moscow correspondent for the National Broadcasting Co., New York.

The Manufacturers Division luncheon will be held at 12:30, at which new officers and directors will be elected. Only members of the division may attend.

The afternoon session to begin at 2:30 will bring a talk by Frederic Snyder, Kingston, N. Y. newsman and publicist, on "Keeping Ahead of the Headlines." Other talks to be heard will include "Developing Public Demand for Good Roads" by C. H. Sells, director, New York State Good Roads Association, Albany, and "Bituminous Concrete Pavements" by Raymond Harsch, manager, asphalt department, Shell Oil Co., San Francisco, Calif. The evening will bring specialized group meetings on accident prevention.

February 1

The joint session of N.C.S.A. and A.L.I. for operating men and equipment manufacturers will begin at 8:15. Presentation of N.C.S.A. safety awards will be made, followed by a panel discussion of operating problems. Members of the panel will include F. H. Edwards, New Haven Trap Rock Co., New Haven, Conn.; E. F. Haberkern, Columbia Quarry Co., St. Louis, Mo.; W. H. Ruby, Acme Limestone Co., Fort Spring, W. Va.; Nelson Severinghaus, Consolidated Quarries Corp., Decatur, Ga.; G. D. Lott, Jr., Palmetto Quarries Co., Columbia, S. C., and Marvin Nelson, Concrete Materials and Construction Co., Cedar Rapids, Iowa.

A luncheon will be held by the two associations at 1:00, at which Merryle Stanley Rukeyser, economic columnist and radio and television commentator from New Rochelle, N. Y., will talk on "What's Ahead for the U.S.A." The afternoon session will be for salesmen, when O. J. McClure, Chicago, Ill., will discuss "Salesmanship —A Lost Art."

A reception of the N.C.S.A. and A.L.I. will be held at 6:00, followed by a joint banquet in the Grand Ballroom. Edward McFaul, Chicago, Ill., will be the speaker. His topic will be "So You Think You're Slipping?"

February 2

This will mark the opening session of A.L.I. Following the call to order and reports by the administrative staff, a talk on "The Geology of Limestones" will be presented by J. E. Lamar, geologist and head, Industrial Minerals Division, Illinois State Geological Survey Division, Urbana. A luncheon meeting will feature a talk by M. H. Lockwood, vice-president, International Minerals and Chemical Corp., Chicago, on "Teamwork."

The afternoon session, opening at 2:30, will bring a talk by A. V. McCormack, director, Agricultural Conservation Programs Branch, Production and Marketing Administration, Washington, D. C. The second speech will be "Soil Conservation Pays Big Dividends" by R. H. Musser, regional conservator, Soil Conservation Service, Milwaukee, Wis. A symposium on promotional activities by state associations and groups will conclude the afternoon program. The group will include H. H. Wagner, secretary, agricultural limestone division, Pennsylvania Stone Producers Association, Harrisburg, Penn.; W. E. Stone, president, Processed Limestone Association, Inc., Piqua, Ohio; R. E. Simpson, engineer-director, Indiana Mineral Aggregates Association, Inc., Indianapolis, Ind.; N. F. Schwarz, secretary, Midwest Agricultural Limestone Institute, Decatur, Ill.; P. N. Doll, manager, Missouri Limestone Producers Association, Jefferson City, Mo.; and C. A. Allen, executive secretary, Iowa Agricultural Limestone Association, Inc., Des Moines, Iowa.

February 3

Talks during the morning session will include "Grassland Farming in Wisconsin" by F. V. Burcalow, extension agronomist, University of Wisconsin, Madison, and a talk by G. H. Enfield, associate extension agronomist, Purdue University, on an allied subject. The annual business meeting will conclude the morning's session.

Equipment To Be Displayed

PRODUCTS AND INFORMATION to be at exhibitors' booths is given in the following list. The asterisk (*) before the company name indicates the exhibit to be part of the N.C.S.A. and A.L.I. show. No symbol signifies that that display is at the N.S.G.A. and N.R.M.C.A. exhibition. A double asterisk before the company name indicates that the company is exhibiting at both conventions.

**Allis-Chalmers Mfg. Co.
Booths 60-61-62-63**

An operating model of a 10- x 8-in. solids pump with plastic piping will show the difference in capacity and pump r.p.m. accomplished by adjusting the Texslide motor base; also on display will be an operating 3- x 8-ft. Ripl-Flo screen, a disassembled reduction crusher, and a cutaway of an operating Low-Head vibrating mechanism.

*American Cyanamid Co., Explosives Department Booth 38

*American Manganese Steel Division
*American Brake Shoe Co. Booth B

*Atlas Powder Co. Booth 10

Latest developments in the Rockmaster split-second delay blasting system, and a display of Atlas improvements for safety and convenience of loaders, exhibited for the first time.

**Austin-Western Co. Booths 98-99

Working models of the company's aggregates plant equipment, and a new motion picture in color and sound will show crusher installations throughout the country.

*Bacon-Pietsch Co., Inc. Booth 87

**Barber-Greene Co. Booths 4-5-6

Model 358 Aggregate Car Unloader.

Blaw-Knox Co. Booths 10-11-12

Main feature a standard 4½-cu. yd. Hi-Boy truck mixer mounted on skids and actually operating; working models of a 2-cu. yd. Hi-Boy truck mixer and a barge-type clamshell bucket operating from a model crane.

**Bucyrus-Erie Co. Booths 33-34

Butler Bin Co. Booth 128

Automatic slide projector showing line of products manufactured.

(Continued on page 162)

****Caterpillar Tractor Co.**
Booths 104-105

Automatic slide projector showing pictures of the company's engines and machines in use in industry, also a cutaway of a D318 diesel engine.

Chain Belt Co.
Booths 70-71-72-81-82-83

New Rex 4½-cu. yd. adjustable Moto-Mixer in operation and on display for first time; also a 3-cu. yd. Hi-Discharge Moto-Mixer. A 4½-cu. yd. unit will be shown on a Dodge truck in the Dodge booth.

Challenge Manufacturing Co.
Booth 133

Will feature models and descriptive literature of the 3- and 5-cu. yd. Challenge truck mixers.

Cleaver-Brooks Co. **Booths 116-117**

Cleaver-Brooks hot water generator, industrial-type water heater with capacities of 665 g.p.h. and 875 g.p.h. for 10 deg. F. rise; 30-hp. steam boiler.

Concrete Transport Mixer Co.
Booth 123

Mounted model of Hi-Lo truck mixer in operation. Concrete will be mixed in a continuous cycle and colored chemicals added to show mixing action.

Concrete **Booth 107**

Publishers of *Concrete*

Consereo, Inc. **Booth 132**

Information on company's truck rental service and types of equipment used available at booth.

Contractors and Engineers Monthly
Booth 87

Publishers display booth, *Contractors and Engineers Monthly*

****Cross Engineering Co.**
Booth 20 NSGA
Booths 95-96 NCSA

Latest developments of engineering and production departments including screening decks, sections and segments for use on all types of screening equipment.

***Cummins Engine Co., Inc.**
Booths 67-86

Two highspeed diesel engines in activated cutaway versions to demonstrate working parts in motion; sections of the engines have been replaced with lucite and are internally lighted.

****Deister Machine Co.** **Booths 35-36**

Two brand new Ag-Lime screens.

***Detroit Diesel Engine Division, General Motors Corp.** **Booths 28-29**

A 3-cylinder cutaway of a GM diesel engine; this is an animated display unit designed specifically to show the construction and operation of the 2-cycle, Series 71 units.

Dewey and Almy Chemical Co.
Booth 115

Several types of manually operated, semi-automatic and fully automatic dispensers for adding Darex AEA to concrete mixes; air meters for the determination of air content of concrete.

Diamond Iron Works, Inc., Mahr Manufacturing Co. Division
Booth 127

Dodge Division, Chrysler Corp.
Booths 118-119-120-121

A tandem-drive truck chassis designed for use with concrete agitators.

Dumperete Division, Maxon Construction Co.
Booths 112-113-114

Two booths to show working models of Dumperete bodies and movies of the bodies in actual operation. The other booth will display products of the Marine Division, and will feature barges, tow-boats, dredges and other marine equipment manufactured and marine repair services offered.

***Du Pont de Nemours & Co., E. I.**
Booth 69

The use of "Nitramon" in coyote tunnel quarrying; the Quarry Blasting Plan for well-drill quarries involving the safety blasting agents "Nitramon" and "Nitramex," and the advantages of firing electrically with the DuPont Blasting Timer will be featured.

****Eagle Iron Works** **Booth 57**

Recent installations of Eagle Swintek dredging ladders, log washers, screw washers and water scalping tanks; a continuous movie showing Eagle equipment.

***Easton Car & Construction Co.**
Booths 49-64

Enlarged photographs of Easton side-dumps: pan, lift door and drop door.

***Euclid Road Machinery Co.**
Booths 70-83

Model UD 10-ton rear-dump haulage unit featured in a series of photographs covering company's line of products.

***Frog, Switch & Mfg. Co.** **Booth 102**

****Gruendler Crusher and Pulverizer Co.** **Booth 1**

Prints and layouts of stationary and portable rock and gravel plant equipment; new impact primary hammermill.

****Harnischfeger Corp.** **Booths 41-42**

The "Magnetorque" control and the new Model 955-A shovel.

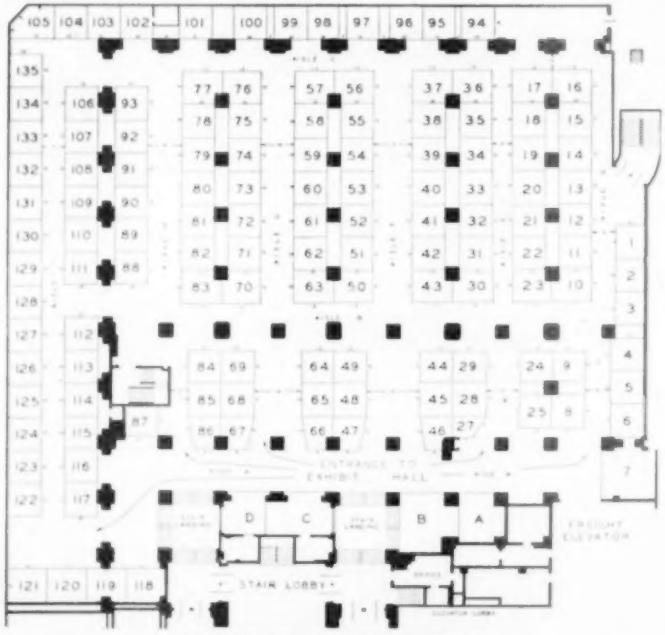
****HarriSteel Products Co.** **Booth 37**

Several samples of screen cloth including Wobbly Weave construction and one new dewatering screen.

Heltzel Steel Form & Iron Co.
Booth 134

Exact scale model of a 200-ton combination batching plant; large photographs and design layouts.

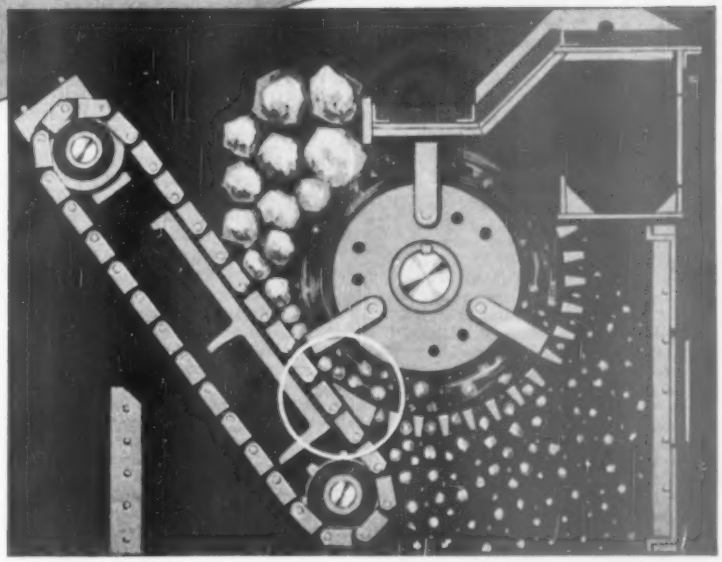
(Continued on page 176)



Floor plan for aggregates industries exhibitions

THE ONE and ONLY NON-CLOG

The Tried and Proven DIXIE Hammermill



Better crushing begins here! Cross section drawing illustrates "heart" of Dixie Non-Clog Hammermill where Extended Moving Breaker Plate construction guards against passage of oversize material . . . results in improved grinding control for unvarying uniformity of product.

Your ASSURANCE of GREATER PRODUCTION at LESS COST

The one and only Dixie NON-CLOG Moving Breaker Plate Hammermill* sets a new standard of crushing efficiency in the reduction of wet, sticky materials.

If you have wet, sticky material to crush, if you have difficulty in reaching and maintaining desired production, *if you have any crushing problem at all,* it will pay you to take advantage of this vastly improved crushing principle.

* *U. S. Patents Granted & Pending*

Dixie Non-Clog Hammermills are made in sizes ranging from 24" up to 72" diam.

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FLORIDA PHOSPHATE Holds Attention of A.I.M.E.

All phases of production considered at Tampa meeting, followed by field trip through plants. Other minerals in South also discussed

By OLIVER BOWLES

FALL MEETING of the Industrial Minerals Division, American Institute of Mining and Metallurgical Engineers, held at Tampa, Fla., November 9 to 11, was timely in that it celebrated the advent into the institute of the new Florida Section recently authorized by the Board of Directors. The Tampa meeting, with registration of about 125, was highly successful. Arrangements were handled by James Weaver, Mulberry, Fla., chairman of the local section and his able assistants, J. B. Cathcart, Allen J. Cole, Lawrence Frye, J. B. Duke and Arthur Crago. The technical program was arranged by Prof. R. M. Foose, Franklin & Marshall College, Lebanon, Penn., chairman of the program committee, and the event was ably supervised by Prof. Howard A. Meyerhoff, chairman of the Industrial Minerals Division. Although registration was largely local, quite a number of members from other areas availed themselves of this opportunity to visit Florida.

The technical program consisting of four well-attended sessions was oriented principally around the phosphate rock industry, although quite a number of other industrial minerals were discussed.

Mineral Resources of Florida

R. O. Vernon of the Florida Geological Survey opened the first session on Wednesday morning with an outline of the general geology of the state. J. L. Carver, also of the Florida Geological Survey, followed with a concise summary of the scope and extent of mining in the state. The leading mineral products in order of importance are phosphate rock, limestone products, and sand and gravel. It is noteworthy that the only metallic minerals of economic value in the state are the heavy minerals such as ilmenite, rutile, and zircon derived from sands. The phosphate industry which began in 1888 with an output of 3000 tons has grown in 60 years to a 6½ million ton industry with an annual value of 38 million dollars. Limestones, second in importance, are most abundant in the northern Gulf and eastern Atlantic Coast areas. Most of them are high in calcium but some dolomitic types occur along the upper Gulf Coast. Sands are widespread in Florida but gravels are confined to a few river bed areas in the north. Some of the sands are pure enough for glass manufacture. Fullers earth is worked in the Panhandle. The value of mineral production increased from 13 million dollars in 1939 to about 48 million in 1948.

R. B. Fuller of the International Minerals and Chemical Corp. opened the subject of phosphate rock with a paper entitled "Phosphate Mining in Florida." Phosphate was known in Florida as early as 1882, and the hard rock was discovered in 1888. By 1890 the industry was firmly established. Log washers and trommels were used widely, and drying was accomplished in rotary kilns fired with wood. Mining costs of pebble rock occurring in creeks and ponds was low. Later it became necessary to remove greater thicknesses of overburden, and hydraulic giants and steam shovels were introduced. Electricity gradually replaced steam. After World War I much research was devoted to recovery of phosphate from rejected fines. The greatest single advance made in the industry was the introduction of froth flotation plants, starting in 1927. By this process millions of tons of phosphate have been recovered from the finely divided matrix. Mechanization has made such advances that the output per man is three times as great as it was 20 years ago.

Phosphate

The Wednesday afternoon session was devoted entirely to phosphate. James B. Cathcart of the U. S. Geological Survey described the distribution of uranium in the Florida phosphate deposits. It is present chiefly in the Bone Valley deposits; very little occurs in the Hawthorn. It is confined to the marine phosphates, and in general, is proportional to the P_2O_5 content. It is presumed that long exposure of the pebbles to seawater permits a greater accumulation of uranium. At best the content is extremely low.

Thomas E. Wayland, also of the U. S. Geological Survey, described the use of isopachous maps in delineating the phosphate beds. Isopachous maps (from *iso*-equal, and *pachous*-thickness) consist of lines connecting beds of equal thickness. Data for their construction are obtained from drillhole records. They are useful in making geologic studies and in planning mine development. They show at a glance the depth of overburden, and the areas where phosphate beds are thickest. The altitude of the bedrock surface below the phosphate may be plotted by adding the depth of stripping to the thickness of the phosphate, and subtracting the sum from the drill-hole collar elevation above sea level. The tonnage of phosphate rock by grades (70-73 percent B.P.L., etc.) in a given area may also be plotted.

O. Hugh Wright of the American Cyanamid Co. described the use of cyclones for desliming and dewatering land-pebble phosphate. The treatment of 600 cu. yd. per hr. of material for elimination of the minus 150-mesh fraction would require a settling area of over 22 acres for thickeners of the type commonly used. As such area was not available at the Saddle Creek Mine, experiments were conducted

(Continued on page 181)

A group of visiting engineers inspect dragline at Noralyn Mine, International Minerals and Chemical Corp., Bartow, Fla.

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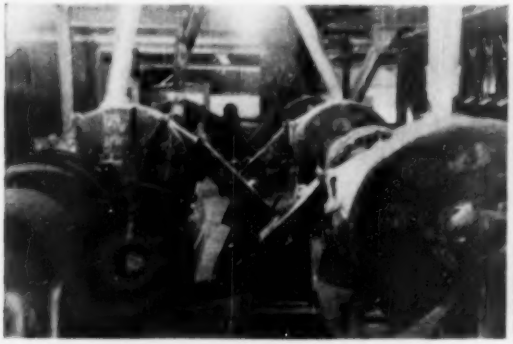
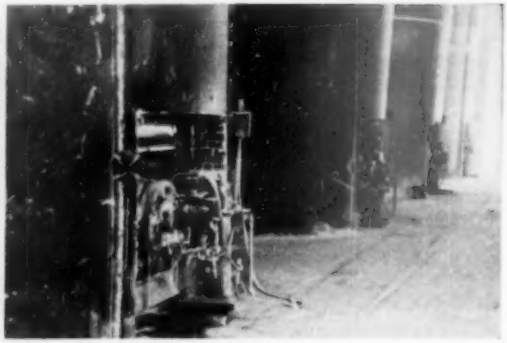
 (Continued from page 141)





Battery of grinding mills for calcined plaster, left, and four batch kettles, right, calcine the gypsum

Loader and shuttle car in mine, left. Car is loaded at rate of 12 ton in 2 min. Right: Drilling in the mine is with electric auger-type drills; a round is typical V-cut pattern

of two 100-ton steel bins. Having two bins permits selectivity according to mill requirements, since most of the plasters manufactured require calcination of higher quality gypsum than is needed for the manufacture of board.

Delivery to the plaster mill, a distance of 3700 ft. with drop in elevation of 900 ft., is accomplished by an Interstate Equipment Corp. Lawson automatic tramway which is automatically charged through compressed air-operated bin gates which are cut off through automatic switches when the buckets are filled.

The tramway was a bottle-neck in the expansion program and its capacity had to be increased, which was done by installing heavier cable and adding more buckets. Each of the 44 buckets carries 18 cu. ft. of stone. The buckets discharge at the lower end into a hopper over a double-deck 5- x 8-ft. Tyler Ty-Rock vibrating screen where stone for portland cement retarder is screened out. This screen carries 1- and 2-in. square openings on a split top deck, with ⅜-in. square openings on the lower deck, and the product sized between decks is dropped into a 120-ton cement rock bin from which railroad cars are loaded. The throughs and oversize are conveyed into the plaster mill and transferred to a cross, shuttle belt conveyor from which a row of four 250-ton bins is filled. Excess can be stockpiled from the shuttle belt.

Plaster Mill

The plaster mill has been unchanged except for increased equipment to step up capacity. Its flowsheet is of conventional design. A 20- x 120-ft. addition was made to the building to house new equipment. A third Raymond mill was added to increase the capacity for grinding gypsum rock for calciner feed by about one-third. A fourth calcining kettle was added, grinding capacity for calcined gypsum was increased and additional packing equipment was installed.

Feed to the Raymond mills from the four 250-ton bins is flexible, permitting drawoff from alternate bins to two of the mills. The new mill is a 4-roll, high side unit with an adjustable speed drive on the whizzer separator and is more flexible in operation than the two older 4-roll, low-side mills. Each has an 8-ft. diameter cyclone collector, and the product is conveyed by 12-in. screw conveyor into either of four 60-ton land plaster bins which are arranged in a row for calcining kettle feed. Alternate flow is to the board plant or to a bin from which land plaster is packed in bags by a 2-tube packing machine.

Fineness of grind of land plaster is 75-79 percent minus 100-mesh for calcination into casting plaster, 85-88 percent minus 100-mesh for hardwall plaster, 86-87 percent through 100-mesh for gaging plaster and 85-88 percent for board stucco.

The calcining kettles are fed land plaster by screw conveyors from the overhead bins. Each is a 10-ft. dia. by 12-ft. Ehrsam batch-type 20-ton kettle fired by a Ray oil burner. Calcining is done on a 2½-hr. cycle at temperatures varied between 310 deg. F. and 350 deg. F. for the several products. Draw-out from the four hot pits is by four parallel 6-in. screw conveyors from each, to a screw conveyor and then to two bucket elevators to two Tyler Hum-mer screens. Alternate flow is to the board plant or return to the calcining kettles.

One of the screens carries 50-mesh cloth and the other has a No. 8-mesh scalping deck over a deck with 40-mesh cloth. Oversize from the screens is put in regrind bins by screw conveyor and the throughs are conveyed directly to the finish bins. There are

(Continued on page 174)

More than 19 years continous quarry service for this sturdy PLYMOUTH LOCOMOTIVE

Beginning its 20th year of efficient service at the Wagner Quarries Co., Sandusky, Ohio, this rugged PLYMOUTH Locomotive continues to operate on a steady 48-hr. per week schedule. Mr. W. J. Sprow, Jr., Vice President, reports that, despite long years of routine hauling and switching on the quarry's 5-mile track, maintenance requires very little more than ordinary routine servicing.

Dependability that lasts for YEARS . . . that's the direct result of PLYMOUTH Engineering, rugged PLYMOUTH stamina. Quarries everywhere have learned the profit-making advantages of PLYMOUTH service, year after year . . . on roughest hauling jobs.

No matter what your hauling or switching needs might be, there's a PLYMOUTH engineered to keep production costs low, and increase the net profits of your operation. Available in gasoline, diesel-mechanical, diesel-electric . . . standard or narrow gauge . . . 2½-ton to 70-ton models.

Write for descriptive catalog of all PLYMOUTH models . . . complete details of how YOU can cut hauling and production costs with PLYMOUTH! Write today! PLYMOUTH LOCOMOTIVE WORKS, Dept. A-5, DIV. OF THE FATE-ROOT-HEATH COMPANY, PLYMOUTH, OHIO.

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PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

Outlook

(Continued from page 101)

"Try to dissuade labor from asking for pensions, due to the low price of our commodity as compared with steel and coal. I think government has taken over too much already."

A producer of aggregates in Minnesota:

"A more realistic viewpoint should be taken on the part of union business agents and an educational campaign for employes put on by individual companies. Every concern would like to provide steady employment, and at high yearly rates, but industry doesn't trust labor and vice versa. Industrial management, rather than haggle with the unions over job classifications while they make work for employes, just 'shuts her down.'

"I believe some kind of a pension arrangement is desirable and necessary. However if industry assumes the pension load then we're going to have to find jobs for all these social security, welfare, and civil employes now benefiting."

A ready-mixed concrete producer in Ohio:

"The stabilization of employment in the construction industry remains the $64 question. Perhaps some equitable solution not now apparent will be found.

"Pensions for 'special groups of employes' in our opinion, should not be imposed upon any industry. Such a system could conceivably result in luxury for the favored few at the expense and impoverishment of the remaining masses. It seems to us that the present social security system with its employer-employe participation is the most sensible. As much as we resent the interference of government into the lives of our citizens, we still see no fairer way to provide old age benefits for *all* the people. We believe our present system of social security could be expanded to give adequate protection to the great majority of the people."

A concrete products manufacturer in Florida:

"To date we have not given the study to the Wage-Hour law that it possibly warrants, and therefore do not feel qualified to make any recommendation. We have been fortunate in this area, but appreciate that this problem will have to be faced in the not too distant future.

"We appreciate that we may be faced with providing pensions. However, to date the size of the firm has not forced this upon us. For a small firm to provide company pensions is not feasible, nor does it give employes the protection required. This is particularly true since it is our belief that as competition grows stronger any recession in business volume may cause an increase in failures of small firms that are forced to compete with the large national concerns. If this happens, the employes have lost the security that a pension is intended to provide. Another method of supplying such pension would be through insurance companies. Here again the security to the employe is not adequate, since should the company be unable to pay the premiums the amount of benefits would not be adequate to cover the intent of the pension."

"A further bad feature of this plan would be to increase the size of the insurance company's investment funds, if all the small companies adopted this policy, to such a proportion that they would practically become the owners of industry through the purchase of their securities, and eventually to protect their rights would become virtual dictators, thus greatly reducing and hampering free enterprise. It is felt that America grew to its present standard of living and economic superiority through the efforts of individuals, their willingness to work, and their ability to provide for their own and their family's security through their own efforts. If the government is going to reduce the necessity for a man to look to the future, then let them assume the responsibility. This, of course, eventually will lead to increased taxes and inflation. The bad feature of our present social security system is that the government is not required to put such funds as it receives into a separate account for the payment of social security benefits, but rather uti-

lizes the money as it sees fit at the time of collection, and will be dependent upon fresh borrowing to meet its obligations. It is apt to find when its obligations are the greatest its ability to borrow will be at its lowest. I therefore wonder if the demands by labor for such pensions are not giving them a false sense of security based upon political expediency, which has never paid off to anyone but the labor leaders and the politicians, who are not too conscientious."

A Western cement manufacturer:

"The pension problem is the most important one facing the small manufacturer these days. With increased taxes, wages, higher costs of materials and supplies, and increased competition, he is finding it more difficult to provide funds for plant rehabilitation and modernization. This makes it extremely difficult for him to even consider pension plans, which would cost him at least $200 per man-year. Unions must realize the seriousness of this problem, else they will eliminate many small operators."

Portable Plants—Specifications

Producers of aggregates with stationary plants, in reply to a question as to whether or not competition from portable plants was on the increase, indicated that the trend toward more portable operations is on the increase. As was to be expected, the greatest activity in that direction is in certain midwestern states including Iowa, Illinois, Missouri and Indiana and in those areas, like in the northern states, which are remote from metropolitan aggregates-producing centers. Long established concerns, which for the first time are experiencing this type of competition, are greatly concerned and many are bitter toward the railroads as responsible for the trend because of the high freight rate increases they have obtained in recent years.

Producers from 21 states reported that activities of portable plants are on the increase and it is of interest that California, Kentucky, Washington, Massachusetts and Arizona are represented in the replies. Of total replies, 47 percent reported increased competition from portable plants. Some of these portables are, of course, owned and operated by government agencies and contractors and are the object of bitter criticism from established producers; however, on the other hand, many are operating to supply large first-class highway projects and some are the property of stationary plant producers who extend their marketing areas by their use.

In response to a question as to whether or not local aggregates specifications are being influenced by those of the U. S. War Department, the answer seems to be "yes" in areas close to where some of the large War Department projects have been built or are being constructed. Other producers

indicate "not yet" which suggests they anticipate attempts to invoke these specifications, which are much more rigid than the ordinary. A few large producers, who believe these specifications sound, are already processing aggregates that would pass such specifications, or are prepared to meet them with their existing plant facilities.

Typical comments on portable plants and specifications are as follows:

An Indiana sand and gravel producer:

"Due to the increase in freight rates we are already experiencing new competition from portable plants. This competition will increase unless the railroads reduce their present freight rates to a more equitable basis. We have not noticed any influence on local specifications due to the U. S. War Department specifications: except the state highway department has proposed a new specification on sand. To make sand in accordance with this new specification, we will require new equipment and plant changes and require a heavy increase in the cost of production."

Crushed stone producers in Kentucky:

"Portable plant competition is troublesome only where large highway jobs involve tonnages of 50,000 or more and occasionally a portable plant outfit will setup for such work."

A producer of crushed limestone in Wisconsin:

"The matter of portable plant competition is very serious and will eventually make the permanent plant just a place for small local supply if it can exist at all. The trouble begins with the State which sets up a specification for certain materials and takes bids. Then somebody quotes a low figure from some roadside pit on a material that doesn't begin to meet the specifications. Then the whole deal is reconsidered and specifications are changed to fit the pit and the low price. When I say state, I mean the various township boards, especially on secondary road improvement.

"I might add the matter of taxation on a portable plant. We who sit in one place are the target for all taxes. The portable fellow leaves his outfit in some township where the taxes are low. He moves into a high tax area, takes the business away from the permanent plant, winds up and moves away before he is required to pay any taxes. I have known some who leave their equipment in various places and dodge all taxes."

Labor Relations Trends

(Continued from page 79)

the employers. One can understand why union bosses want to discourage profit-sharing, but it is difficult to understand why the public's money should be spent in an attempt to frustrate employers from exercising their generous human instincts. Also, it is difficult to see where the employes of such an employer profit. In this case,

a flat bonus was paid to each as a help in meeting his cost of living. There is no logical or humanitarian reason why such a flat bonus should not be the fairest solution of the problem. Certainly the lower-paid employes would need it most. As the government now compels the employer to distribute the bonus, the higher the pay the more the bonus, which undoubtedly is quite satisfactory to the few who make high wages but defeats the original humanitarian motive.

Moreover, what does it profit the three women who raised the ruckus over the time-keeping records? Where before they were free and easy in reporting for work and in quitting time, keeping their own records, their employer has now probably installed a time clock, or in any event a record is kept, which they probably would now prefer for personal reasons not to be kept. There are fortunately, compensations and retributions in the scheme of the universe.

Aggregates

(Continued from page 132)

and sometimes over the bottom decks as well, is stockpiled by an inclined stacking conveyor in the 10,000-ton surge pile which is over a 96-in. Armco tunnel. From this pile, the stone is drawn off by two Iowa 36-in. x 6-ft. apron feeders to a reclaiming belt conveyor which splits the stream over two 4- x 8-ft. Iowa double-deck, horizontal vibrating screens. Plus 6-in. stone is put through a 4033 hammer mill driven by a 17000 Caterpillar diesel engine through V-belt. This mill has no grates and its output is returned over the screens to complete a closed circuit. Stone sized between the two decks is finished 3- x 6-in. product and is dropped via chute into a 75-ton carloading bin.

Minus 3-in. stone from the first bank of screens is split over two 4- x 12-ft. Iowa double-deck horizontal vibrating screens where two finished sizes are produced. Overs from the top deck (3- x 1½-in.) are put in one bin and the product screened out between decks (1½- x ¾-in.) into another bin. At this point several alternate routes may be followed to increase the output of minus ¾-in. material in order to balance production. Excess 3- x 1½-in. stone can be routed to a Williams No. 40 slugger-type pulverizer and excess 1½- x ¾-in. material to a 40- x 24-in. Iowa roll crusher. Products of these crushers are returned over the screens. The Williams mill is driven by 175-hp. and 120-hp. Caterpillar diesel engines in tandem, through V-belt. A 140-hp. Murphy diesel engine drives the rolls.

Minus ¾-in. stone passing these screens is split over three 4- x 12-ft., type F-600, Tyler Tyrock vibrating screens with two decks. These screens carry ⅜-in. openings on the top decks and No. 4 mesh below, so that the ¾- x No. 4 product is a result of splitting and re-combination. Purpose of splitting the stream is to enable the

rolls and No. 40 pulverizer to be used in the manufacture of sand at times when sand might be produced on the off-shift. Then part of their product can be stockpiled for later reduction and sizing.

In the primary flow, stone retained on the top two decks is re-combined and put in the ¾-in. x No. 4 bin. In one alternate arrangement, this product may be stockpiled in an 8000-ton surge pile over a 96-in. Armco tunnel. In another, plus ¾-in. stone or plus No. 4, or both, may be put in any desired quantity through either a 4033 Iowa hammermill or two No. 40 Williams NF type pulverizers. The hammermill is driven at 1100 r.p.m. by a 160-hp. Murphy diesel engine and has 3/16-in. grates. The No. 40 pulverizers have ⅛-in. grates and are driven by 160-hp. and 174-hp. diesel engines at the higher rate of 1600 r.p.m., in order to build the production of fines in the 30- to 50-mesh size range. Product of the latter two mills is circulated back over the screens, while that from the 4033 hammermill joins the minus No. 4 material from these screens for direct feed over the next bank of screens.

All minus No. 4 material is split over four 4- x 10-ft., T-38 Tyler single-deck Hum-mer screens and two 4- x 12-ft. Iowa horizontal vibrating screens, and the run-over is placed in the No. 4 x 16 sand bin. Alternate flow, to increase the relative production of minus 16-mesh fines, is to put excess No. 4 x 16 material through two No. 2 Universal pulverizers, driven by 100-hp. electric motors, and to re-screen the output of the pulverizers. Also, No. 4 x 16 material can be withdrawn from its bin and put through pulverizers for the production of more fines. Minus 16-mesh material is fed to a 16-ft. Sturtevant mechanical air separator for removal of excess 100-mesh fines, which are conveyed to a 10-ton waste bin from which trucks are loaded for stockpiling. The coarse material from the air separator, which would constitute rejects in cement mill application, is the No. 16 x 0 fine sand and is conveyed to a railroad loading bin.

Approximately one-third the feed to the air separator is excess minus 100-mesh material and wasted. Its analysis is 100 percent through a No. 30 screen, 99 percent minus No. 50, 90.5-93.5 percent finer than 100-mesh and 74.5-77.5 percent through 200-mesh. Under favorable weather conditions, 40-48 t.p.h. of finished material are produced through the air separator and 20-24 t.p.h. are wasted. Total production of sand (two sizes) is from 72 t.p.h. to 80 t.p.h.

At the damsite, the four coarse aggregate sizes are washed and rinsed through equipment of the Concrete Materials and Construction Co. The stone is unloaded through a railroad hopper and fed out by an apron feeder to a belt conveyor and put through two revolving scrubbers in parallel. The scrubbers are converted asphalt sand dryers with special rings fitted

inside to impound water and cause scrubbing action to take place. After passage over a washing screen, the material is transferred to the contractor's belt for stockpiling.

An interesting point is that greatest breakage takes place in the larger sizes, so a 25-ton bin was provided along side the washing plant to recover washed stone that has broken down and is suitable for the next smaller size classification.

As material is withdrawn from the contractor's stockpiles, it is rinsed over another screen provided by the aggregate producer and the stone is then conveyed to the tower for the batching plant.

The plant is in an isolated location, so complete machine shop facilities were provided for general repairs and maintenance. Repair parts are flown in by air from Dallas suppliers and an air strip has been built adjacent to the plant for the purpose.

Car spotting is important since continuity of operation depends upon having sufficient cars available at each loading bin when they are needed. A 25-hp. G.E. diesel-electric locomotive is kept busy in this service.

Concrete Materials and Construction Co., with headquarters at Cedar Rapids, Iowa, is headed by H. D. Bellamy and S. P. Moore. The company operates a number of crushed stone, sand and gravel and agricultural limestone plants in the midwest and is also engaged in the highway contracting business. This project is one of several large special structures for which the company has supplied aggregates in recent years. Leroy F. Ramer is superintendent at Carbon.

Durability

(Continued from page 126)

comparative purposes the sieve analysis of a typical sample of the finished product is also shown. Fig. 2 shows the product of the ball mill, which is on the fine side, and the sieve analysis of the blend of the natural washed sand and the crusher product, which is naturally on the coarse side. It is evident from a glance at Fig. 2 that the mean of the two graphs would just about fill the bill. That would be, of course, the average of equal parts of both. That is the dotted line graph in Fig. 3, which it will be noted corresponds very closely to the screen analysis of a sample of the finished sand.

What the operation actually accomplishes is a substitution of fines made from crushing and grinding gravel for the fines washed out in the clay and loam, with the addition of more material passing the No. 8 mesh. The product may be varied, as will be seen by the reference to the October article, largely by control of the percentage of the minus 3/16-in. material, collected and blended from all three sources, that is fed to the ball mill. The final product is purposely a little on the coarse side because it has been found to deteriorate in storage.

Gypsum

(Continued from page 166)

three 90-ton hardwall regrind bins. Two casting regrind bins hold 50 tons each.

Regrinding is done by Ehrsam 36-in. vertical-type buhr mills fed by 6-in. buhr feeders. Ten of these mills are in service. Hardwall plaster is ground to 88-90 percent minus 100 mesh and casting plaster to 98-99 percent through 100 mesh.

Screw conveyors and bucket elevators are the means of transfer to a row of finish bins, consisting of three 90-ton hardwall bins, two 35-ton casting bins and a 25-ton gaging bin. Plaster is batched out in Ehrsam 1-ton weigh hoppers, mixing is done in Ehrsam 1-ton double barrel mixers and packing of hardwall, gaging and casting plasters is done by individual 3-tube St. Regis packing machines now in use. Belt conveyors, screw conveyors and bucket elevators in the plaster mill and throughout the entire plant are largely of Conveyor Co. manufacture.

Board Plant

Biggest expansion has been in the board plant which has been rebuilt to more than double the original capacity. The program comprised additional stucco bins, an extra starch tank and resin tank, doubled steam boiler capacity, the lengthening of the board conveyor line by over 200 ft. so that speed could be increased from 40 to 90 f.p.m., and proportionate enlarging and lengthening of the dryer. Capacity is 55,000 sq. yd. of ⅜- x 16-3/16- x 48-in. perforated lath (the principal product), or 50,000 of the plain lath in 24 hr. Also manufactured is wall board 4 ft. in width and from 4 to 16 ft. long in increments of 1 ft.

Calcined plaster, or stucco, is fed into four stucco bins by screw conveyors from the plaster mill. Alongside is a small accelerator bin. Other equipment in the proportioning and mixing end consists of a 5-ft. dia. resin tank, two 5-ft. starch tanks, a U.S.G. foam generator and primary and secondary mixers just ahead of the forming rolls. Paper instead of sawdust is used as binder and a Buffalo hammermill pulverizes the paper.

Originally, the 52-in. conveyor line was 356 ft. in length from the forming rolls to the punch. This has been increased to 560 ft. and includes three belt sections and two accelerating roll sections. Then follows a 16- x 24-ft. transfer table and a 6-deck automatically-operated feed tipple into the dryer.

The steam board dryer was extended in length (enclosed) from 187 ft. 2 in. to 371 ft. 4 in. largely through extension of the tempering zone, total length now being 461 ft. 1 in. from the end of the transfer to the takeoff. The dryer, transfer and feed tipple were manufactured by Coe Manufacturing Co. and the board machine equipment including conveyors, knife and punch were manufactured by Ehrsam. Steam for drying at a top temperature of 350 deg. F. is supplied at the rate of 27,000 lb. of steam per hr. by two B & W Sterling boilers of 900 hp. combined capacity.

Among the regular checks made according to A.S.T.M. procedure are weight tests, bond tests, water absorption and break tests on lath. Board and lath are handled by lift trucks into railroad cars.

The expansion program was completed under the general supervision of W. G. Bradley, vice-president of Blue Diamond Corp. H. L. Waldthausen, Jr., is works manager; Jack Lafever is plant superintendent; Marion Brooks, mine superintendent; Tilghman Rhea, board plant superintendent, and Floyd Day, maintenance superintendent.

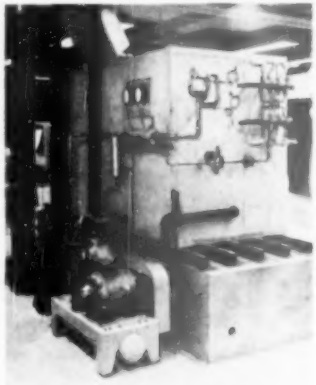
Research

(Continued from page 143)

matically controlled through a Taylor Fulscope. This unit maintains a continuous record of temperature and humidity inside the room. The room is of special construction, consisting of 4 in. of concrete block, 4 in. of cork and an interior lining of plaster waterproofed with several coats of water gas tar. A Baker ice machine in conjunction with heater coils keeps the room at a uniform, predetermined temperature. Two aspirators, operated by compressed air and drawing water from float-controlled tanks, produce a dense fog which ensures a relative humidity approaching 100 percent.

Individual constant temperature rooms have been provided for sulfate soundness testing (70 deg. F.) and for studies of alkali aggregate reaction (100 deg. F.). Noisy and dust-producing equipment is housed in another room, separately ventilated and soundproofed.

Some of the more recent purchases for the new research laboratory are



Automatic freezing and thawing equipment being installed, showing specimen chamber with thawing water tank below; compressor, pumps, pressure gauges and refrigerant controls

illustrated in the accompanying photographs. The staff, supplemented by several student assistants, consists of the following: Stanton Walker, director of engineering; Delmar L. Bloem, assistant director of engineering; E. J. Zeigler, associate research engineer; James F. Shook, Jr., assistant research engineer; and W. G. Mullen, graduate research fellow. The latter is working under the Stephen Stepanion Fellowship sponsored by the National Ready Mixed Concrete Association.

Vincent P. Ahearn is executive secretary for both associations. Thomas E. Popplewell is president of the National Sand and Gravel Association and Robert F. Porter is president of the National Ready Mixed Concrete Association. S. S. Steinberg is dean of the College of Engineering at the university.

Slag Convention

(Continued from page 145)

G. A. Mattison, Jr., Woodstock Slag Corp., reported on membership; and Fred Hubbard, Midland Slag Co., on the problems of the industry.

Edward C. Levy, Edward C. Levy Co., wanted information on the use of salt on slag-concrete pavement and Charles Allen, Ohio Highway Department, replied that Vinsol resins interground with the portland cement as an air-entraining agent had helped prevent scaling and that linseed oil emulsions and asphaltic treatments were being tried, particularly in New York. He cited an instance where some old concrete poured long before air entrainment came into the picture on recent tests had up to 6 percent air in it. He attributed this to lubricating oils in the older portland cement plants leaking into the finished material. Later the mills did not permit leakage of the lubricating oil and that possibly had effect on the cement.

The noon luncheon was presided over by C. E. Ireland, president, Birmingham Slag Co., and the guest speaker was L. B. Craig, division engineer, Southern Railroad System, Louisville, Ky. The speaker outlined the requirements for present day ballast, maintaining that the fines in ballast were the problem and that producers could do much to help keep them at a minimum. He pointed out that cinders, or "front end contamination" was on its way out due to the more widespread use of diesel engines. Mr. Craig told how some clay roadbeds had been stabilized by drilling holes on 30-in. centers (2⅜-in. dia. or larger) and exploding a small charge of dynamite in the hole, after which it was filled with sand.

The afternoon session was presided over by Fred Hubbard. The first paper was presented by Herbert Cook, U. S. Army Engineers, Vicksburg, Miss., who told of the use of air-entrained concrete in the large dam structures and how the use of such materials had eliminated the use of cooling pipes

in the large dams. He also told of some of the problems relating to the placing of concrete (2-2½- and 3-bag per cu. yd. mixes) using 6-in. aggregate and that it was necessary to redesign the buckets formerly used so as to better handle concrete with the larger aggregates. Mr. Cook briefly described the new concrete laboratory of the U. S. Engineers at Clinton, Miss., and said the Engineers had six other concrete laboratories scattered through the country. He showed slides of the Clinton laboratory as well as other slides showing what they were doing towards testing pre-packed concrete structures, and investigations involving the use of the vacuum process as applied to concrete construction. He also said studies were going on relating to pozzolanic materials and reactive aggregates.

New Uses

Charles Allen, research engineer, Ohio State Highway Department, told of the use of granulated slag to correct some poor pavements. In this work the granulated slag was spread over the old road and traffic admitted, after which the road was covered with a bituminous surface. He said that the crown of an old road could be moved by first spreading a thin layer of granulated slag over it in the above manner. Granulated slag also was effective, he said, in correcting "rocking" concrete pavements and that pumping roads were also benefited by the use of granulated slag when used essentially as above described.

He also told of some of the experiences relating to compaction of granulated slag. Some slags, it developed, will compact, and others will not. And it was brought out also that the so-called "good" granulated slags will not compact as well as the types not usually classed as a good granular material. Evidently, some of the fine, wire-like ends, and other elongated small pieces of slag are a factor in its compactability.

The afternoon session closed with a talk by A. H. Hinkle, district engineer, Asphalt Institute, on "Important Features and Increased Use of Asphalt in Pavements." The speaker told of some tests being made with asphaltic-type pavements that had thick sand and gravel bases, and of the use of slag for non-skid surfaces. He also told of the use of ground rubber in asphaltic mixes that was intended to increase durability and non-skid characteristics.

The following officers were elected: C. A. Barinowski, vice-president; G. A. Mattison, Jr. former vice-president, becomes a member of the executive committee; R. A. Dierker, Duquesne Slag Products Co. and H. N. Snyder, Buffalo Slag Co., members of the executive committee.

Early in the evening a reception was held in the presidential suite after which the annual banquet was held. G. A. Mattison, Jr. was master of ceremonies.

Conventions

(Continued from page 162)

****Hendrick Manufacturing Co.** Booths 8-25
Various types of perforated metal used in the screening of aggregates; a 12- x 12-in. hand testing screen for testing samples.

***Hercules Powder Co.** Booths 44-45

Hercules Steel Products Corp. Booth 130
Hercules Aircreter, a non-agitating air-entrained concrete dump body designed to eliminate segregation.

Frank G. Hough Co. Booth 131

A scale model of Model HL Payloader; new exhibit backdrop showing Payloader uses in industry.

****Iowa Manufacturing Co.** Booths 39-40

Jaeger Machine Co. Booths 27-28-29-44-45-46

***Jeffrey Manufacturing Co.** Booths 81-82
Large impact-type crusher of new design; a 30- x 60-in. Jeffrey-Traylor electric vibrating feeder.

C. S. Johnson Co. Booth 78
Translites and photo enlargements of Johnson concrete plants; literature will be available on the equipment.

***Joy Manufacturing Co.** Booth 106
Complete line of quarry equipment in photographs, showing the 58-BH rotary blast-hole drill as well as wagon drill, rock drills and hydro drill jibs.

***Kennedy-Van Saun Mfg. and Eng. Corp.** Booth 7
Mural photos of Kennedy gearless reduction crusher; new style Kennedy Triple A cataract screen; photos of Kennedy complete aggregate processing plants in Venezuela and Portugal.

****Kensington Steel Co.** Booths 9-24

***Keystone Driller Co.** Booth 12

****Koehring Co.** Booths 79-80
Translites and photo enlargements of Koehring equipment; literature will be available on excavators, Dumptors, and the 16-E twinbatch rubber-tire mounted concrete mixing unit.

****Lima Shovel and Crane Division, Lima-Hamilton Corp.** Booth 101
Series of photographs depicting the company's complete line of shovels, cranes and draglines.

****Link-Belt Co.** Booths 74-75-76

Littleford Bros. Inc. Booth 102
Stationary model of steam generator.

****Ludlow-Saylor Wire Co. Booth 73**
A variety of samples of industrial wire cloth and screens, particularly the Super-Loy Live-Wire screens for vibrating screen sections; sizes of screens to be shown will be from 1-in. bars to very fine light sections.

****Mack Manufacturing Corp.**
Booths 92-93

****Marion Power Shovel Co. Booth 88**
Photographs of power shovel equipment.

Master Builders Co.
Booths 109-110-111
Two themes will be developed, one on quality concrete through the use of Pozzolith, the second the means for holding operators' present customers and developing new ones by merchandising job-tailored ready-mixed concrete.

****McLanahan & Stone Corp.**
Booth 89
Small model of log washer and crusher; pictures of equipment in operation.

Medusa Portland Cement Co.
Booth 122

***Murphy Diesel Co. Booths 65-66**

****N. P. Nelson Iron Works, Inc.**
Booth 100
New Model P-11 Heavy Duty Bucket Loader with full hydraulic control, Timken bearing elevator, continuous spiral feeder.

***New Holland Machine Co. Booth 43**
Diorama showing a scale model quarry, a working model of a dual impact crusher and continuous sound-color movies of the action occurring inside a double impeller breaker.

****Nordberg Manufacturing Co.**
Booths 14-15
A 22-in. Symons cone crusher and a 4FS-1 diesel engine generator unit; an automatic slide projector of plant installations.

***Northern Blower Co. Booths 47-48**
A working scale model of an Automatic Bag Type Dust Arrester.

****Northwest Engineering Co.**
Booths 58-59
Photographs of the company's equipment on display.

***Pennsylvania Crusher Co. Booth 78**
New No. 35 Kue-Ken jaw crusher fitted with plexiglass cover on oil reservoir and in operation; large cross-section model of the crusher jaws; a Pennsylvania CF-00-18 reversible impactor.

****Pioneer Engineering Works, Inc.**
Booth C
Cutaway models of Pioneer jaw crusher, roll crusher and vibrating

(Continued on page 178)

screen; new "factory sealed" conveyor idlers displayed for first time; model of strongest pan feeder.

Pit and Quarry Publications Booth D

Publisher of *Pit and Quarry* and *Concrete Manufacturer*.

Portland Cement Association Booth 7

This display will show the association's promotional efforts in the use of quality concrete.

Robins Conveyors Division, Hewitt-Robins Inc. Booths 50-51-52-53-54

Heavy-duty scalper, Style M Vibrex screen for sizing; a 30-in. sectionalized conveyor 25-ft. long, equipped with Hewitt-Robins Ajax conveyor belt; all equipment will be in operation.

*Rock Bit Sales and Service Co. Booth 94

Display of tungsten carbide detachable bits and drilling rods with carbide inserts.

**Rock Products Booth A

Publisher of ROCK PRODUCTS and CONCRETE PRODUCTS.

**John A. Roebling's Sons Co., Woven Wire Fabrics Division Booth 13

Samples of aggregate wire screening constructions including Roeflat, Roeslot, and Roeton; special steels for screening.

*Sanderson-Cyclone Drill Co. Booth 68

Sauerman Bros. Inc. Booth 38

Projector will show pictures from field and factory embracing all that is new in Sauerman excavating and material-handling equipment.

Scientific Concrete Service Corp. Booth 124

Exhibit will show methods used for precision control of concrete manufacture.

**Screen Equipment Co. Booths 2-3

A 3- x 8-ft. Seco vibrating screen will be displayed.

Sika Chemical Corp. Booth 125

**Simplicity Engineering Co. Booths 30-31-32

New 4- x 14-ft. triple-deck horizontal vibrating screen in operation.

W. W. Sly Manufacturing Co. Booth 108

Models demonstrating the Sly "Economy" dust filter for use in ready-mixed concrete truck batching. This piece of equipment consists of a dust filter unit with cloth filter bags, exhaust fan, 3-hp. motor and a telescoping hood with air piping to the dust filter. In practice, the filter is

mounted on the weigh platform or some nearby location and the telescoping canvas hood is fitted over the discharge into the truck-mixer.

T. L. Smith Co.
Booths 47-48-49-64-65-66

****Smith Engineering Works**
Booths 16-17

Full-size Vibro-King screen and models of new Gyrasphere crusher; models of jaw crushers and heavy-duty apron feeders, supplemented with pictures.

Solvay Sales Division, Allied Chemical & Dye Corp.
Booth 129

Backdrop-type display featuring the use of Solvay calcium chloride in concrete work; literature describing the effects of $CaCl_2$ on portland cement concrete.

****Stedman's Foundry and Machine Works, Inc.** **Booths 18-19**

****Stephens-Adamson Manufacturing Co.** **Booth 97**

New Sealmaster carrier and installation photos.

Symons Clamp and Manufacturing Co.
Booth 106

New Symons magnesium wall form units, including inside and outside corner sections and filler frames cut from extruded magnesium alloy.

****W. O. and M. W. Talcott, Inc.**
Booth 21

Talcott conveyor belt fasteners for splicing conveyor belting and the Acme Steel Patch Fasteners for emergency repairs to damaged conveyor belting.

****Taylor-Wharton Iron and Steel Co.**
Booth 77

Literature and consulting service available at booth.

****Thew Shovel Co.** **Booths 22-23**

Colored translites illustrating application of the company's equipment in mines and quarries; continuous sound motion pictures in color showing equipment in use.

***Torrington Co., Bantam Bearings Division**
Booths 134-135

Many types of anti-friction bearings, including self-aligning, spherical roller bearings and radial roller bearings; these bearings are widely used on vibrating screens and rock crushers.

***Traylor Engineering and Mfg. Co.**
Booths 71-72

Display will be built around a series of photographs illustrating Traylor

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machines both installed and in the company's plant on the erection floor.

****W. S. Tyler Co.** **Booths 90-91**

A 4- x 10-ft. Ty-Rock screen in operation; also a large selection of woven wire screens and testing sieves.

****Universal Engineering Corp.**
Booths 55-56

Photographs, loader transmission, crusher models, sound movies showing the Pettibone Mulliken speed loader, the Haiss loader and the Universal TwinDual gravel plant.

***Vibration Measurement Engineers**
Booth 46

New technological developments in vibration control (from blasting), including equipment and photos; among devices to be shown will be a calculator for computation of tonnages from blasting.

Waukesha Motor Co. **Booth 126**

Display will show inside workings of a diesel engine by means of colored illustrations and a 50-60-hp. six-cylinder diesel engine.

White Motor Co.
Booths 47-48-49-64-65-66

Worthington Pump and Machinery Corp.
Ransome Division
Booths 67-68-69-84-85-86

Experimentation

(Continued from page 156)

as uniform and sound as the concrete in the rest of the pavement. This eliminates many man-made spalling troubles. Secondly, there is a uniform riding surface at these joints, thus eliminating the customary slight bump as a car crosses them. The saw has been so well received as an improvement in pavement construction methods that it is being seriously considered as the standard method of forming the contraction joints.

Undoubtedly this project should go a long way towards proving or disproving the theory that the "old fashioned" are more suitable for use in concrete pavements than are the more modern, quick-setting cements. This project should go a long way towards evaluating the transparent membrane as a curing material as compared to the 24-hr. wet burlap and long period of wet earth method. There are other improvements in finishing and curing concrete pavements which can result from this study. Results will be reported from time to time as progress reports. It is quite likely that a long period of time will be needed before a complete final evaluation can be given to the efficiency of each of these various sections composed of their various materials and constructed by various methods.

A.I.M.E. Meeting

(Continued from page 164)

with cyclones. They proved to be quite effective substitutes for hydroseparators.

Waste Utilization Problems

Poole Maynard of the Atlantic Coast Line Railroad pointed out a possible use for the minus 150-mesh waste. Waste utilization is highly desirable inasmuch as the waste material is already present in vast quantities, and is accumulating at a rate of about 3 million tons a year. Dr. Maynard found by laboratory tests that extruded pellets of the slimes have good bloating properties when calcined in a rotary kiln at temperatures between 1750 and 2000 deg. F. At 2100 deg. the material would begin to melt and stick. Thus a lightweight aggregate of from 25 to 30 lb. per cu. ft. could be made. It was estimated that a plant capable of making 500 t.p.d., which would be sufficient for the Tampa area, could be built for $250,000 to $300,000. By adding limestone and dolomite to the slimes, mineral wool could be made.

Stream Pollution Is Not a Problem

Any mining industry that produces vast quantities of fines of minus 150 mesh and much of it minus 300 mesh, is liable to be confronted with stream pollution problems. As phosphate mining is in this category, R. C. Specht of the University of Florida Experiment Station made a comprehensive study of the effect of phosphate waste disposal on the condition of receiving streams. At most phosphate plants the treatment water is recycled so effectively that it has little or no turbidity when it reaches the receiving streams. Careful tests of the streams failed to show any recog-

Giant hydroseparators employed to dewater phosphate. White area in left background is small part of minus 150-mesh waste

nizable increase in turbidity or any toxic effects on fish.

North Carolina Talc

On Thursday morning, E. C. Van Horn of the T.V.A. described talc occurrences in the Murphy district of North Carolina. Lens-shaped talc bodies of high quality occur in association with the Murphy marble. The talc runs 95 to 99 percent pure, and is suitable for crayon manufacture as well as for pulverized products. Ground talc is prepared in Raymond mills, and yellow talc is purified by a wet process, filter pressed and dried. The reserves of the area appear to be large.

A Building Stone of Diversified Uses

Building stones of the Crab Orchard area, Cumberland County, Tennessee, were described by Benjamin Gildersleeve of the T.V.A. This unique multicolored, thin-bedded quartzite is remarkable for its adaptability to a great variety of uses.

Heavy Minerals from Sand

Heavy minerals such as ilmenite, rutile and zircon are being separated commercially from Florida sands in two plants, one at Jacksonville and the other at Starke. J. Hall Carpenter of the Humphreys Gold Corp. described the principles of an improved method of treating the sands which he designates high-tension separation. It is an outgrowth of the so-called electrostatic method that has long been used. It employs a rotor and a fine wire constituting a beam-type electrode which is very effective in changing the mineral grains. The high-tension method is applicable to sizes as fine as 250 mesh, and the process is unaffected by moisture.

Southern Clays

Paul M. Tyler, industrial mineral consultant of Kensington, Md., discussed some important phases of kaolin mining and treatment in the South. The principal china clays occur in the Tuscaloosa (Upper Cretaceous) formation, and are mined chiefly in South Carolina and Georgia.

Uses of Pseudowavellite

W. L. Hill of the U. S. Department of Agriculture described tests to determine the usability as fertilizer of pseudowavellite. This mineral, which has a composition expressed by the formula $4CaO \cdot 6Al_2O_3 \cdot 4P_2O_5 \cdot 14H_2O$, occurs in large quantities in some Florida phosphate deposits. By calcination at a temperature of 660 deg. C. a product having a citrate solubility as high as 80 percent can be made. Thus it has valuable properties as a fertilizer but it deteriorates upon storage.

Minor Elements in Phosphate

The final paper of the meeting, by V. E. McKelvey of the U. S. Geological

Survey, described the various elements that are present in small quantities in phosphate rock. Fluorine may be present in quantities reaching 2 to 4.5 percent. The T.V.A. recovers it as silicon fluoride. Small quantities of uranium were discovered in the Phosphoria formation in 1944. The association of vanadium with western phosphate has been known since 1911. Some of it is now being recovered. The cerium group of minerals was found in Russia phosphate some years ago. Traces of silver are found in phosphate rock all over the world, the maximum reported is ¼ oz. per ton. Zinc, nickel, molybdenum and sulfur are also found. Fluorine is the only one of these minor constituents that can be recognized visually, even with a microscope. The presence of others can be detected only with special equipment, but they afford a promising field for research.

Amicable Entertainment

Other papers, of lesser direct interest to producers of nonmetallic minerals included one, "Fluoride in Groundwater of Alabama," by Phillip E. Lamoreau of the U. S. Geological Survey and "Economic Aspects of Groundwater in Florida," by H. H. Cooper of the U. S. Geological Survey. At the well-attended dinner and dance on Thursday evening, Chairman Howard A. Meyerhoff introduced as speaker Russell Kay, publisher of the *Florida Newspaper News* and *Florida Radio Digest*. His glowing forecasts of "Florida's Future" were interspersed with diversified witty entertainment.

Field Trip to Phosphate Operations

On Friday, November 11, about 60 of those attending the meeting visited the phosphate mines and mills near Bartow. The first stop was at the Noralyn mine of the International Minerals & Chemical Corp. The center of attraction was "Tillie the Toiler," the 850-ton giant Bucyrus-Erie excavator that scoops 25 tons of either overburden or phosphate at a bite and carries it on a 175-foot boom. The machine can walk in 7½-ft. strides on a pair of 7- x 40-ft. shoes. The earthy phosphate rock is washed into a sump with hydraulic giants, and pumped, through a 16-in. pipeline, at the rate of 1000 tons of solids per hour to the concentrating plant. The slurry carries 35 to 45 percent solids and the pipes wear out in about seven years.

The party then visited the concentration plant where the phosphate is treated in several stages. The material is first washed and screened to two sizes: minus one millimeter and plus one millimeter. The latter, called pebble rock, is free of sand and clay and is ready for drying. The minus one millimeter material is screened into two sizes. The 14- to 35-mesh fraction is concentrated in spirals which utilize centrifugal force to sep-

arate phosphate from sand and clay. The minus 35- plus 150-mesh fraction is concentrated in flotation cells. The minus 150-mesh product is waste. Dewatering is accomplished in large hydroseparators. The finished materials from both spirals and the flotation plant, together with the pebble rock, are transported to Mulberry where large rotary driers prepare it for shipment.

Following lunch-box refreshment, the party visited the Coronet Phosphate Co. mill. A striking difference in method at this mill is the substitution of a series of concentration belts for spirals in processing the minus 14- plus 35-mesh fraction. A flotation reagent is added and frothy phosphate is guided over the edges of the travelling belts by a series of inclined stationary scrapers slightly submerged in the slurry. The sand remains on the belt for discharge. The minus 35- plus 150-mesh fraction is concentrated in flotation cells as in the other plant visited. Both companies furnished guides who were most cooperative in explaining each process in these interesting and well-arranged plants.

Field Trip to Heavy-Mineral Plant

On Saturday a small group visited the heavy minerals separation plant of E. I. du Pont de Nemours & Co. near Starke, Florida. This is a dredging operation in an extensive sand deposit. The heavy minerals recovered constitute about 4 percent of the sand. About one-half of this 4 percent is made up of titanium minerals including ilmenite, arizonite and leucoxene. Zircon is recovered in excess of present market demands. Large quantities of staurolite, an iron-aluminum silicate, are also recovered. Can anyone find a use for this mineral?

Perlite Aggregate: Its Properties and Uses

APPEARING in the November, 1949 issue of *Journal of the American Concrete Institute*, an article by J. John Brouk, Precast Slab and Tile Co., St. Louis, Mo., is titled as above. Introduction to this article describes perlite, gives its origin, physical and chemical analysis. Gradation limits for expanded perlite for various uses are next discussed, with particular emphasis on insulating concrete. Lightweight structural concrete with perlite aggregate is also discussed.

In conclusion Mr. Brouk points out that expanded perlite aggregate, to give satisfactory results, must be processed carefully. He further states that perlite aggregate concrete can be successfully used in precast products, floor and roof slabs, and poured-in-place items. Straight perlite aggregate concrete, or perlite blended with proper amounts of heavy aggregates produces concrete of any density from 20 to 140 lb. per cu. ft.

CONCRETE PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE

Batching Plant of Turner Gravel Co., Inc., San Antonio, Texas

A SECTION OF
ROCK PRODUCTS

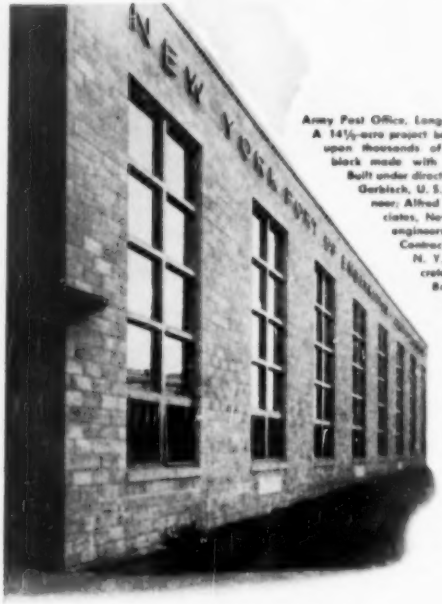
Ten Years Ago . . .

A Decade of ATLAS DURAPLASTIC AIR-ENTRAINING PORTLAND CEMENT

concrete made with Duraplastic cement got its first test. In August, 1939, this test paving was laid in Second Avenue North, Minneapolis. The badly scaled section of roadway in the background was made with regular portland cement. The foreground section, *laid at the same time*, was made with Atlas Duraplastic—the first commercial use of the air-entraining portland cement originated and developed by Universal Atlas.

Both sections, subjected to the severity of ten Minneapolis winters and to heavy applications of de-icing salts, are shown just as they appeared in July, 1949—convincing proof of the durability and lasting good appearance of Duraplastic concrete. Longitudinal structural crack shows some ravelling. Note perfect transverse joint.

Today . . . . Manufacturers rely on DURAPLASTIC* for superior concrete products



Army Post Office, Long Island City, N. Y. A 14½-acre project built with thousands upon thousands of superior concrete block made with Atlas Duraplastic. Built under direction of Col. Edgar W. Garbisch, U. S. Army District Engineer; Alfred Hopkins and Associates, New York, architects-engineers; John A. Johnston Contracting Corp., Brooklyn, N. Y., contractors; concrete block by National Brick Corp., Long Island City, N. Y.

Successful field performance during the past ten years on a variety of paving and structural jobs consistently proved that Atlas Duraplastic made better concrete at no extra cost.

Noting this, more and more manufacturers of concrete products began to use Duraplastic for concrete block, brick, pipe, drain tile, silo staves and other products.

Today, for machine-made products, like the block shown here on this tremendous Army Post Office job, manufacturers find they can use a damper mix—one that's more cohesive, holds together better and feeds easily through machines. Finished units are more compact and exhibit greater resistance to passage and absorption of water. Appearance and face texture are generally improved. Edges and corners are clean-cut and truer.

To provide superior concrete products to meet the construction needs of today and tomorrow, use Atlas Duraplastic. It complies with ASTM and Federal specifications, calls for no unusual changes in procedure and costs no more than regular cement.

*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

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MAKES SUPERIOR CONCRETE PRODUCTS AT NO EXTRA COST

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INDUSTRY NEWS

Catalog of Concrete Masonry in Sweet's File

IN LINE with a decision reached at a recent meeting of the Board of Directors, the National Concrete Masonry Association has arranged for a four page catalog to be inserted in Sweet's File, Architectural for 1950. First page, in two colors, has a layout consisting of four illustrations of typical concrete masonry installations, including a cinder block church. Pages two and three carry specifications as well as line drawings of "Typical Hollow Concrete Masonry Units." The last page bears line drawings of six selected typical patterns possible with concrete masonry construction.

Supplies Precast Lining for French Canal

BILLNER VACUUM CONCRETE, S. A., Philadelphia, Penn., has announced the conclusion of an agreement with the French government agency, Electricite du France, to build what is claimed to be the world's largest prefabricated concrete project. This project calls for the precasting of 6,000,000 sq. ft. of lining for a 20-mile long canal now being dug in connection with a large government power development in the Rhone valley. The job will involve precasting 20,000 concrete slabs, each 31 ft. long, 10 ft. wide, 3½ in. thick, and weighing 7½ tons. A newly developed lifter, using the vacuum principle to provide even stress distribution, will be utilized to remove the slabs from the molds at the central casting plant and to place them in position in the canal site.

Soft Sandstone in Concrete

RESULTS of recent tests conducted by the National Sand and Gravel Association regarding various percentages of soft sandstone in concrete indicate that when present in moderate quantities, the soft sandstone has only a very slightly deleterious effect. The question of how soft must a soft particle be was also investigated. Delmar L. Bloem, assistant director of engineering for the Association, brings out in his letter of transmittal for the data sheets that the judgment of the testing engineer regarding softness would be influenced by his geographic location and the type of aggregates with which he was familiar.

Pipe Company Denies Nuisance Charges

GRAY CONCRETE PIPE CO., Greensboro, N. C., defendant in a $6000 damage suit for creating a "nuisance," has denied the allegations and asked dismissal of the action. The defendant declared that it is using modern machinery approved for general use and that no more noise, vibration, smoke or dust or other objectionable conditions exist at its plant than at any plant of a similar nature.

Carter-Waters Corp., Kansas City, Mo., presented this exhibit at the 55th Annual Public Works Congress and Equipment Show held in the Kansas City, Mo., Municipal Auditorium, Sept. 18-21. Nearly 600 public works officials, city engineers, contractors, consulting engineers, sanitary and traffic engineers and utility supervisors from the United States and Canada registered for the conference sessions. The Carter-Waters display showed products manufactured by the firm and the uses to which they are put. These products include Blok-Mesh reinforcing steel for masonry walls, Blok-Seal portland cement base paint for waterproofing, Haydite aggregate and block, and Saturock cold asphaltic concrete for surfacing streets, playgrounds, etc.

CLIFTON COAL & SUPPLY CO., Cleveland, Ohio, has purchased a ready-mixed concrete plant from Belleville Lumber & Supply Co., South Bend, Ind. The plant was originally purchased from the government at the end of the last war but has not been operated since 1947 when neighbors complained of the dust nuisance. It is now being dismantled for shipment to the Cleveland firm's Brookpark Rd. yard.

THOMPSON COAL CO., Roanoke Rapids, N. C., is producing ready-mixed concrete and cinder block in addition to its line of coal supplies and fuel oil. Carl S. Thompson is president of the company.

DUNN BROS., Pinckneyville, Ill., has begun construction of a new $25,000 ready-mixed concrete plant at St. John, Ill. Bins and two new mixer trucks have already been purchased by the company, headed by Ralph, Marion and James Dunn.

EDINA CONCRETE PRODUCTS CO., Edina, Minn., is negotiating for the purchase of land in nearby St. Louis Park. The company plans to build a $50,000 plant for the manufacture of concrete block using pumice from New Mexico as the lightweight aggregate.

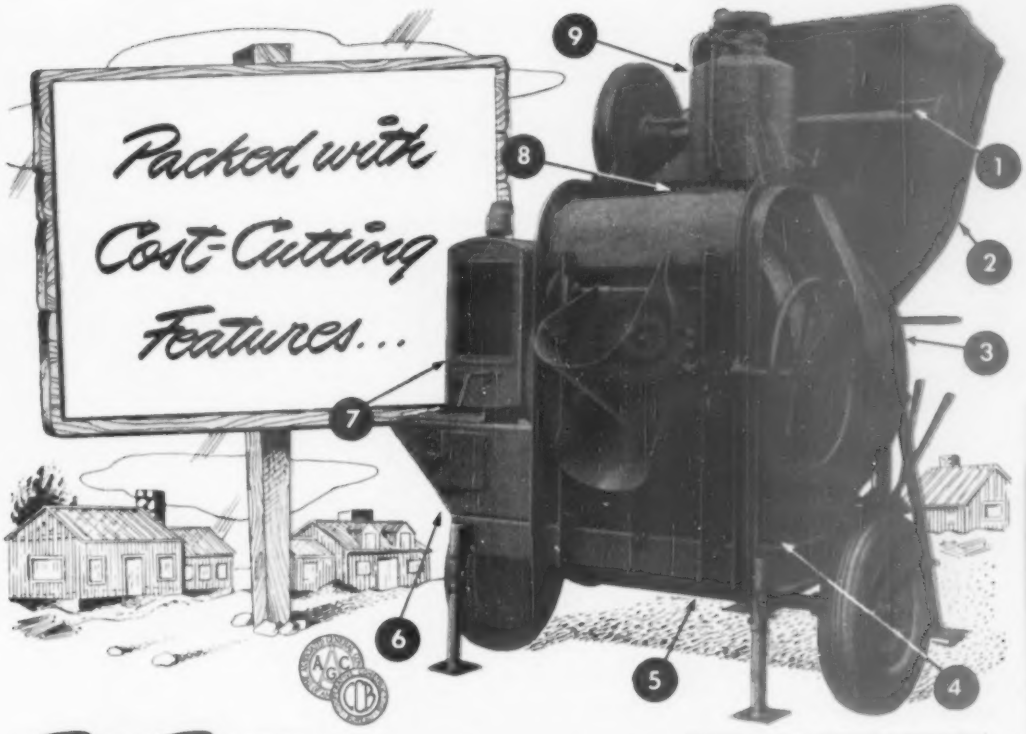
WAMIX, INC., Dallas, Texas concrete contractors, will move its mixing plant soon to a 3-acre tract in the Trinity industrial district, according to T. L. Amis, president.

PORTSMOUTH MIXED CONCRETE, INC., Portsmouth, Ohio, is planning to erect a 40- x 80-ft. concrete block building to house the firm's trucks. Officers of the company are Samuel and Ralph Frowine and Harry Graff.

SOUTHEASTERN CONCRETE PIPE ASSOCIATION, INC., Charlotte, N. C., was recently granted a charter to manufacture pipe. Incorporators are Ivy Smith, Dick Carroll and Henry Strohecker, Jr.

KRUMHAUS BLOCK CO., Waukesha, Wis., is planning to level a portion of a slope behind its plant and fill in part of its sand quarry to provide storage for an estimated 500,000 block, according to Fred Krumhaus, owner of the firm. The company recently put a new block machine in operation, its greater output necessitating the increased storage area.

FLORIDA CONCRETE PIPE CO., Ocala, Fla., has begun production in its new plant of concrete pipe to supply the northern and central sections of Florida. Both plain and reinforced pipe in sizes from 6 in. to 120 in. in dia. are being manufactured, according to I. Heintzman, production supervisor. Approximately 35 men will be employed by the plant.



BLUE BRUTE design shows you what to look for in a portable mixer

Give a Worthington-Ransome Blue Brute 11-S or 16-S Portable Mixer a thorough going over — and get a real revelation of how far mixer-design has advanced! For example: ❶ *skip cable* winding shaft, mounted on self-aligning bearings, has grooved spools for longer cable life; ❷ *power loader* with automatic knock-out and brake set when skip raises to charging position; ❸ *skip vibrator*, simple and effective, assures quick transfer of materials from skip to drum; ❹ *drum rollers* of genuine car wheel metal with chilled treads — each roller mounted on two Timken bearings; ❺ *roller sub-frame* under drum prevents concrete accumulation on roller shaft or bearings; ❻ *countershaft* of heat-treated alloy steel in self-aligning ball bearings — all units easily accessible; ❼ *engine* mounted with radiator facing mixer's discharge side avoids dust, clogging and overheating; ❽ *drum drive gear* of one-piece semi-steel casting, machined to true circle; ❾ *water tanks* of accurate, exclusive spiral cut-off type — no rubber to deteriorate.

These and many other features — including Ransome's perfected mixing action, famous for producing better quality concrete — are the reasons why construction men everywhere depend on Blue Brute Portable Mixers for more concrete at less cost. See your nearby Worthington-Ransome distributor for performance facts that prove *there's more worth in a Blue Brute.* 99-9

A Blue Brute 16-S Portable Mixer speeds operations on a big housing project in Springfield Gardens, Long Island, N. Y. This machine is one of a fleet of both 16-S and 11-S Blue Brutes owned by Angelo Aragona, who says: "I am well pleased with their performance and economy."

Worthington Pump and Machinery Corporation, Worthington Construction Equipment Dept., Harrison, N. J.
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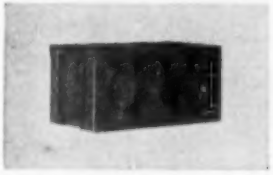
In this time, the uses have increased from a few minor hut-like buildings to a full range of the most important structures including residences, apartments, stores, schools, hospitals, and office and public buildings in all sections of the country.

And with good reason, for practically a whole new science has been developed in the making of concrete in the last half-century. New machinery has been created for high quality, high speed production. Architectural design and engineering developments have kept pace.

Similar advances are found in the production of materials—aggregates and Trinity White cement.



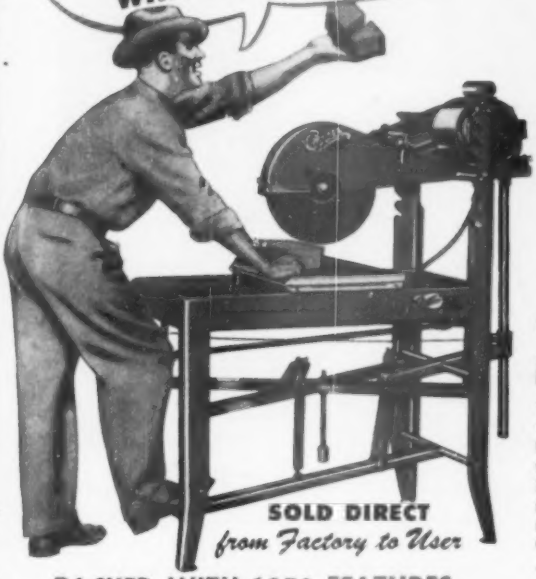
"Imitation rock-face" Block was the Fore-runner of MODERN CONCRETE MASONRY

The beginnings were humble—imitation rock-faced block were made of unwashed sand and gravel and sun cured. A startling contrast with today's widely used concrete units made with full benefit of modern technology. Trinity—the whitest white—is ideal for white or colored finishes for concrete masonry. May be used either as portland cement stucco or in cement paint form.

Architectural Concrete Units made with Trinity— The whitest white cement

The finest structures such as the Prudential Building, Los Angeles, use architectural concrete units made with Trinity White—a true portland cement. In addition to its fine appearance, architectural concrete units contribute uniquely to structural economies. Trinity white is recommended for use in terrazzo. Its extra whiteness gives an extra whiteness to the matrix, or, with colors added, a purer color tone.

LOOK! JOE . . . I made this cut with my Clipper in 5 seconds!



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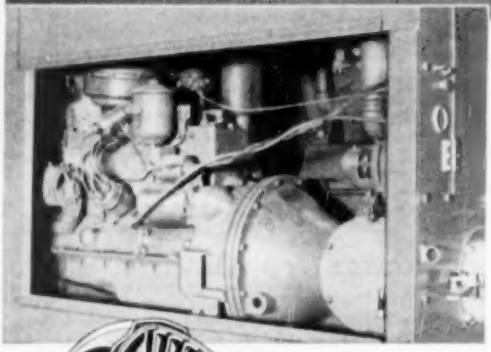

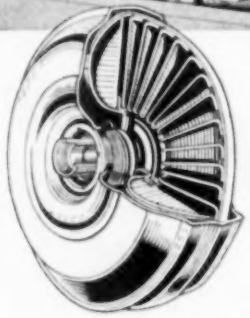

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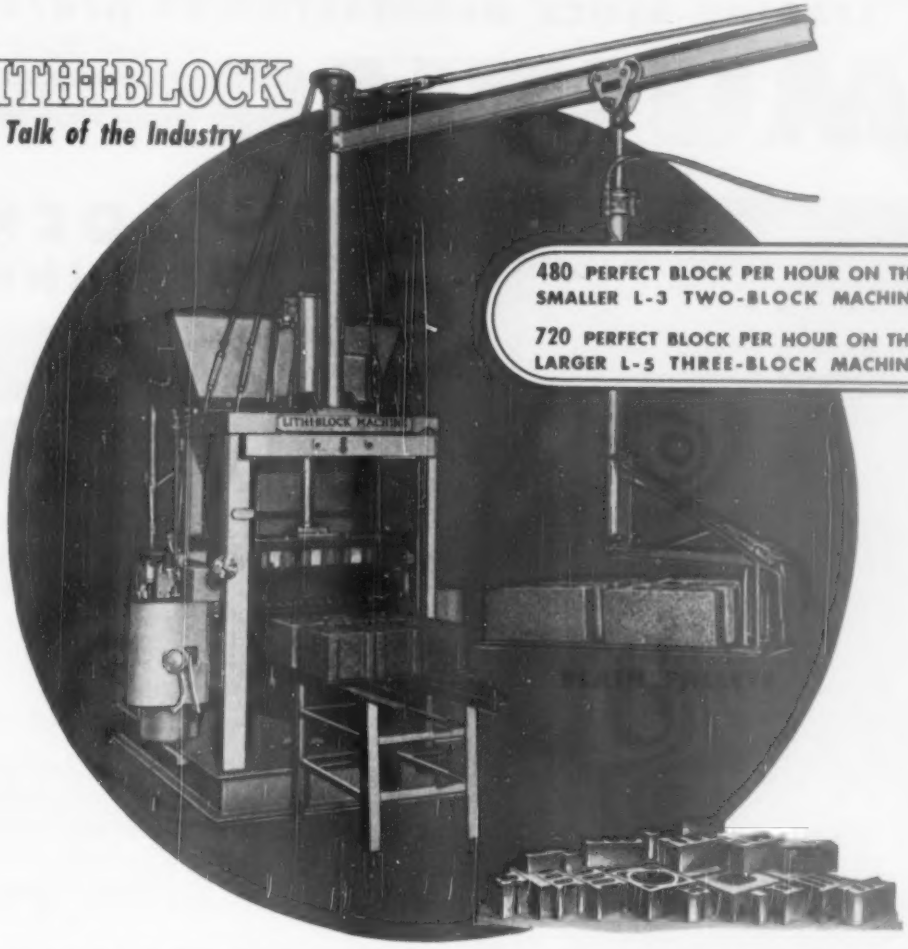

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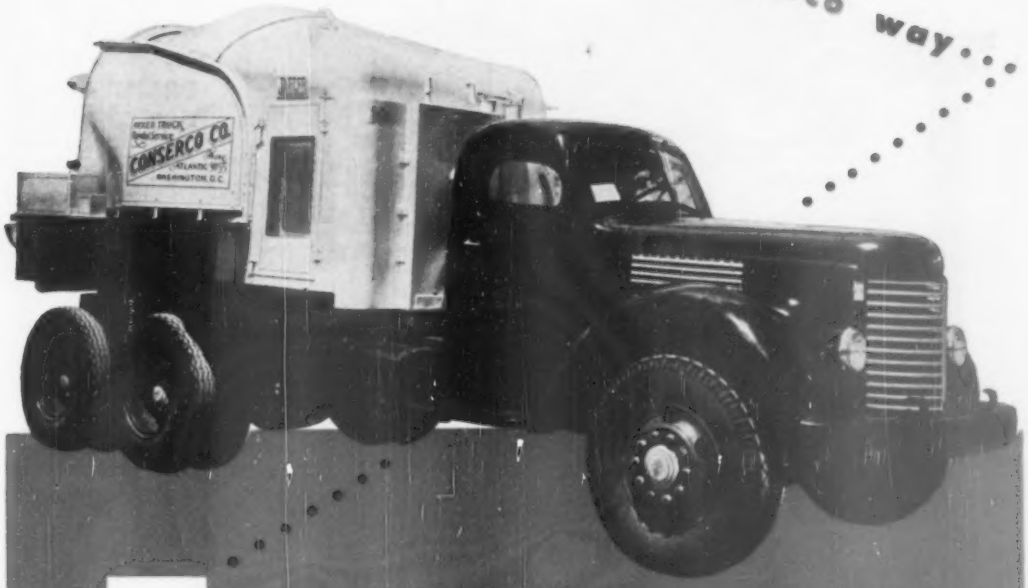

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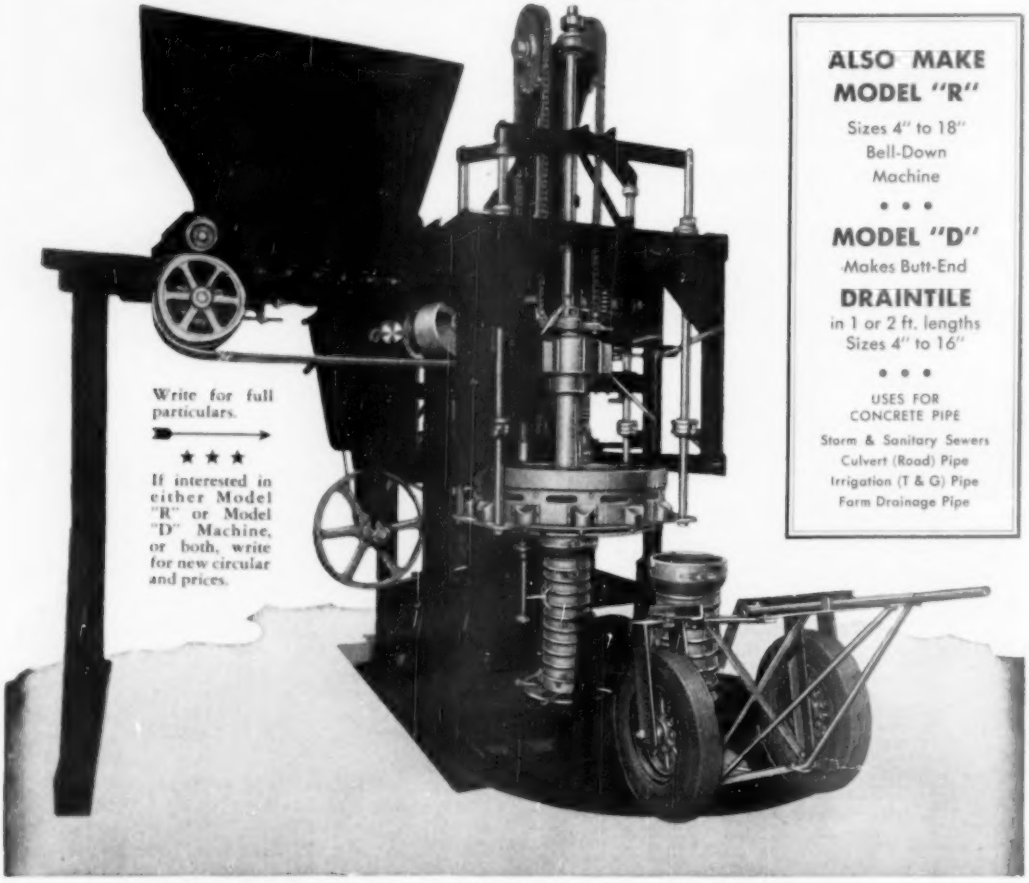

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Floor and Roof Slabs of Concrete Masonry Units

Units are dried and then dipped by means of conveyor into water-proofing solution

Basalt Rock Co.'s Strestcrete system of fabricating machine-made units into slabs and wall panels gaining acceptance on national scale

By BROR NORDBERG

WHILE IN CALIFORNIA very recently, we spent two profitable days with the Basalt Rock Co., Inc., Napa, witnessing the manufacture and installation of Strestcrete, which is the trade name of a slab system for roof and floor construction which utilizes machine-made concrete units secured together with prestressed steel.

Strestcrete has been manufactured at Napa for over a year and first came into national prominence at the Cleveland, Ohio, convention of the National Concrete Masonry Association, January 31-February 3, 1949, when the slab system was put on display. Like in the case of any new product, we were curious to learn more about this system of wall panel, roof and floor slab construction and to determine whether or not it was gaining acceptance and was here to stay. It was fortunate, for us, that we were privileged to join the touring board of directors of N.C.M.A. on October 11, 1949, when inspection was made of the manufacturing process at Napa and when the installation of panels in actual construction of a building was demonstrated.

The interest in the product was most enthusiastic, and president A. G. Streblow and his staff were called upon to answer a host of questions about manufacturing costs and the practicability of the product in construction. As a result of the field trip and the very apparent approval of this system of construction, several new licensees were added to a growing list of concerns about to begin its manufacture over the country. We came back a second day to learn more about Strestcrete.

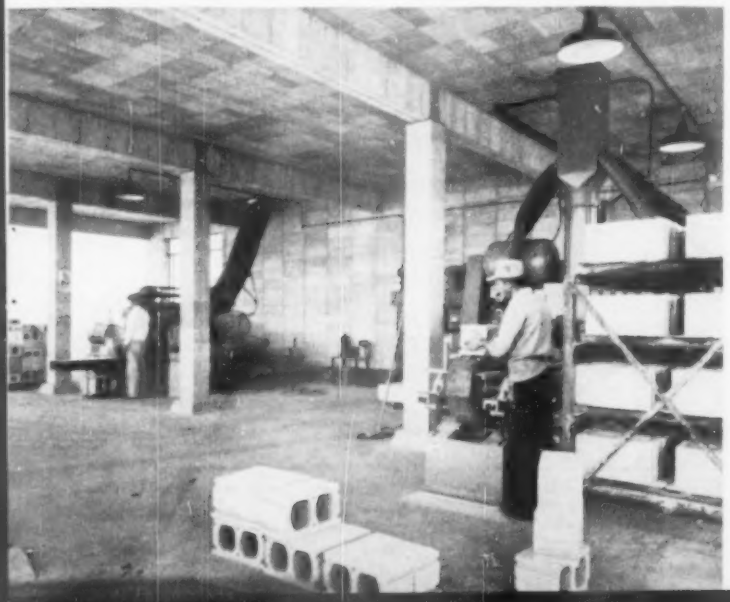
The process of manufacture and fabrication, as now standardized at Napa, is the result of exhaustive experiment and research in an endeavor to develop floor, roof and wall slab systems utilizing precast concrete units made by mass production methods on standard high capacity block machines.

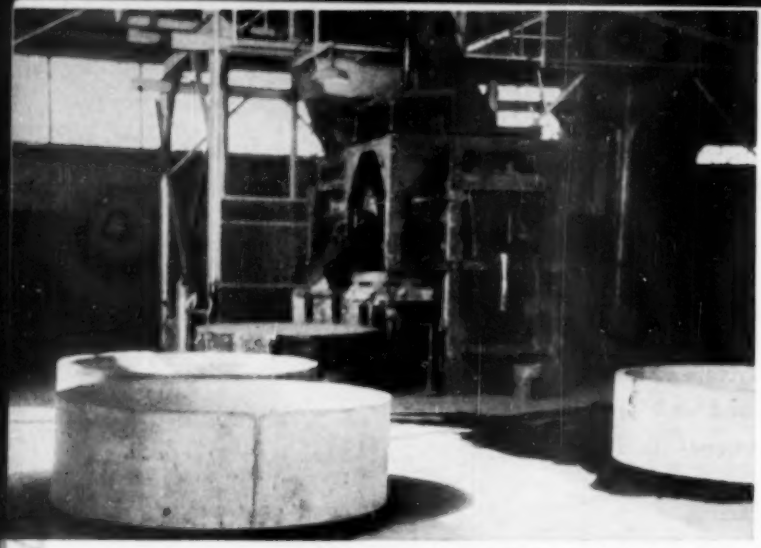
The objective was development of slabs and panels which would behave like a monolithic structure—that would, in fact, be structural concrete though an assembly of small units—in competition with poured concrete. Having attained this goal as proved by tests, new markets for concrete masonry units have opened up for the company, which give promise of surpassing the already large volume it enjoys in supplying concrete units which are laid up singly. Mr. Streblow had in mind that inasmuch as concrete masonry units are superior construction materials they need not be limited to competition with other ordinary building units for laying up walls, etc., and that through design and fabrication they could be given the versatility and flexibility to become more of a primary building material. This would permit the producer to realize more of the cost of a building through fabricating it, in large part, in his own plant under controlled conditions, thereby minimizing job-site labor requirements and permitting more effective utilization of labor.

Instead of supplying standardized masonry units for walls alone, the company now produces roofs, floors, ceilings and walls that are nearly completed as the panels and slabs leave the plant, materially reducing job-site costs and putting masonry units in a much higher price classification but yet with overall savings to the builder.

In Strestcrete, the contacting surfaces of machine-made concrete units, as they will be assembled in panels, are precision ground in order to secure full bearing for effective prestressing when the units are drawn together and secured with prestressed steel rods which are positioned into grooves provided for, in

Units for prestressed slabs and panels are precision ground by these two machines, which simultaneously grind opposite surfaces to parallelism. Building is constructed of Strestcrete units





A machine-made watering trough, one of many specialties made at Napa

the units as designed. The shapes of the units, their method of assembly, and erection of various kinds of panels on the job are illustrated herewith. Strestcrete products at Napa are roof and floor slabs, tongue-and-groove siding and stud walls, with many variations to provide for curved surfaces and other shapes.

Before Strestcrete was put on the market, it was subjected to thorough tests, for both bending and shear, under supervision of H. M. O'Neil Co., structural engineering firm of Oakland, Calif. Twenty-eight of 48 structural slab panels were subjected to bending moments and the tests were conducted to failure in bending for spans of from 8 to 20 ft. The other 20 were subjected to shear tests until failure. Units of 4-, 6-, 8-, 10- and 12-in. depths, and of 16- and 32-in. width, with and without prestress, were so tested.

Results of the tests indicated that the slabs, of precast units with prestressing, conformed under load so as to justify design by the same principles used for reinforced concrete design. Prestressing was proved to reduce deflections by 25 to 30 percent at design loads, which is the main consideration in roof slabs, and to increase the loads at which cracking appears by from two-thirds of design load up to 200 percent of design load. The structural engineering firm found, without qualification, that such floor and roof slabs produce in effect structural slab construction. The tests were witnessed by engineers and architects who were invited to view the demonstration.

Uses

Greatest progress, so far, has been in the sale of roof and floor slabs but the more recently introduced tongue and groove wall panels are rapidly being developed for all kinds of applications. The company is selling Strestcrete roof slabs for jobs where, according to its experience, no other type of concrete roof system would have been acceptable. Among the roof and floor jobs are individual homes, dehydrator plants and other industrial and commercial buildings of all types. A bus depot has been built of Strestcrete stud walls and roof slabs, the walls and roof of which were actually completely erected in two days. These slabs are being installed in structural steel buildings, or of poured concrete framing, and as roof decking for arched, flat or gabled roofs.

Tongue and groove siding is being applied on buildings of steel framework, and one of the big outlets is the farm market, for which individual units of curved design are manufactured and prestressed with vertical steel in the construction of grain bins and silos. An interesting variation is the erection of prestressed columns, illustrated here, for the support of a heavy, overhead traveling crane. These columns are 22½ ft. high, of a 36- x 24-in. H-section fabricated from two 12- x 8- x 20-in. full units and one 12- x 8- x 12-in. half unit.

The product is still very new and many designs and applications are still in the development stage or yet to be created. As an example, a few bridge decks have recently been developed which may find use in the building or replacement of highway bridges. Certainly, precast bridge decks have possibility of great speed and economy in many uses. As we write this, the chances are that other new ideas have been developed for the application of Strestcrete that will open new outlets.

Units that comprise a slab or panel are assembled in the plant to required length and depth and with sufficient steel area to carry required designed loads. In a floor or roof installation, no vertical shoring is required. There is great latitude in application since depths of units are designed to fit the job application and steel is prestressed to about the stress required in the designed loading of a floor or roof section. Therefore, there will be very little or no deflection in spans of any practical length. A typical degree of prestress for standardized

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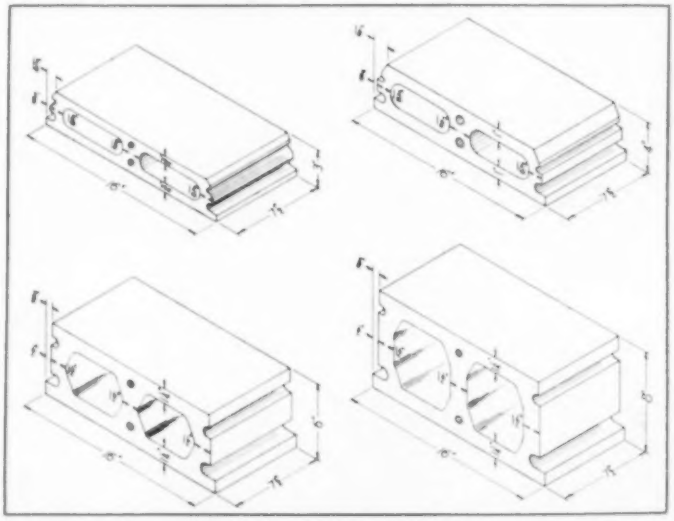
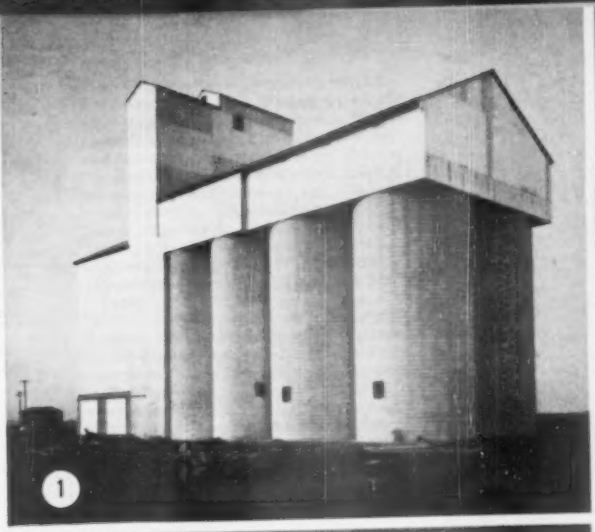
RIGHT:

(1) Grain bins of Strestcrete construction. (2) Versatility of Strestcrete construction is illustrated here in columns for support of heavy traveling crane. (3) Laying a sloped roof with Strestcrete units. (4) View of storage yard at Napa, where space is practically unlimited. (5) Underside of a Strestcrete floor which is ready for direct application of paint or plaster. (6) Installation of Strestcrete roof on small California home



Standard roof and floor slab units as manufactured at Napa. Similar units are available in 10- and 12-in. depths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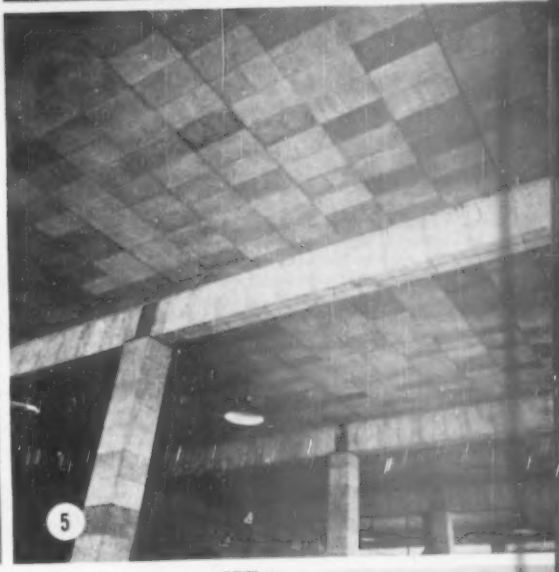
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Assemblying units into Strestcrete slabs

slabs of sizes supplied many jobs is about 17,000 p.s.i., although it can be varied according to span, size of units and type of steel selected. In slabs, or panels, assembled at the plant the steel is brought up to stress by calibrated torque wrenches of the same type used in the automotive industry. Factory-assembled slabs and panels are shipped to the job and are handled and placed by contractor-operated cranes and other power equipment. For certain structures, like silos, the prestressing can be applied on the jobsite.

In the case of roofs and floors, customary practice is pour a minimum of concrete grout between the slabs in the form of a joist, for coverage of the steel and to key the slabs together. A concrete slab may or may not be poured on the top. Such a slab, according to tests, will function with the precast slab as a single structural member.

Strestcrete slabs for roofs and floors, and panels of various thicknesses from 3 to 12 in. are assembled in widths up to 8 ft. or more. Roof slabs for spans up to 30 ft. in length have been made and installed.

Advantages

A number of advantages are claimed for these products, speed and economy being the foremost. On-the-site labor can be used for assembly, utilizing power equipment for lifting the slabs in place. In a typical small house, 2300 sq. ft. of roof slab varying in width from 32 in. to 6 ft. 8 in. and in 18- to 20-ft. lengths was placed in 3½ hr., and without interference with other crafts while being installed.

According to the company, construction with Strestcrete is cheaper than with any other non-combustible material and a house, so built with exposed and painted walls will compare in price with stucco and frame structures. The smooth under-surface of floors does not require finishing and provides a ceiling ready for direct application of paint or a plaster coat. Floors can be covered directly with linoleum, hardwood, asphalt tile or carpeting.

Manufacture

Basalt Rock Co. has three Besser Super Vibrapac block machines at Napa and the units are manufactured by these machines, only requiring special mold boxes. Any acceptable aggregate can be used. Pumice is used at Napa, it being the standard aggregate for all units and produced by the company from its own deposits.

The units are high temperature steam-cured, according to accepted practice today, and after 24 hr. in the kilns are yarded for a minimum period of 28 days. All handling is by power lift trucks.

Then, the contact surfaces are ground in precision grinding machines which grind both sides simultaneously by carborundum wheels as the units are fed through. The original machine was designed and built by the company. A newly-installed Gardner machine has more automatic features. Grinding is to six-thousandths of an inch of true parallelism between faces. A suction fan and cyclone dust collector take care of the dust. After grinding, the units are ready for assembly into slabs or panels.

An outstanding feature in the production of wall units is a waterproofing process that was perfected recently that suggests a possible solution to the shrinkage problem and attendant cracking in any type of concrete masonry construction.

After grinding, wall units are placed back in the kilns to be dried out by a hot-air blast applied at 180 deg. F. for 24 hr. Moisture is almost entirely driven from the units in the process, and they are then conveyed to a dipping tank for the application of waterproofing. The dipping tank contains a solution of stearate, synthetic resins and mineral spirits that penetrates 1/16 to 1/18 in. into the concrete as units are conveyed through by a submerged, power-driven drag conveyor. Units are then ready to be assembled and prestressed.

This is the first time that we have seen the waterproofing of concrete masonry units on a mass production scale and it apparently represents a sound attack on the problem of volume change due to shrinkage of concrete masonry walls. The process may later be applied to standard Basalite masonry units. A test panel of waterproofed units, when subjected to a continuous stream of water under normal water-main pressure for days at a time, has withstood penetration of any moisture, which indicates that the waterproofing is likely to be effective in resisting rain penetration, mortar pickup, etc. The ingredients are purchased in large quantity and mixed at the plant. Costs of the waterproofing, per unit, are very low.

Assembly

Ground units are assembled on make-up tables and brought into compression with the threaded rods fitted into the grooves provided in each unit and tension is applied to the required figure by the torque wrenches. The tables are horizontal for slabs, and tongue and groove wall units are assembled on tables slightly tilted

A. G. Streblow, president

from the vertical. Rod-straightening, cut-off and threading equipment comprise the facilities for handling the reinforcing steel.

All this equipment is housed in a separate building where the assembly work is done. The building is 40 x 100 ft. and 22 ft. high to the eaves. It is of steel framework and was enclosed entirely of Strestcrete roof slabs and tongue and groove siding, in demonstrations conducted for architects and engineers. The steel trusses were spaced 16 ft. apart and slabs were fastened to the framing by welding. Siding, consisting of panels 16 ft. in length by 6 ft. 8 in., was erected at a high rate of speed. The grinding machine building is also of Strestcrete construction.

Merchandising

Strestcrete is merchandised by the Strestcrete Division of Basalt Rock Co. under the direction of H. A. Price, sales manager for the division. In addition, the rights to its manufacture and sales in other areas of the United States are being licensed to selected concrete masonry producers. As this is written, licensees are installing the special equipment or going into production in Hamden, Conn., Syracuse, N. Y., Buffalo, N. Y., Chicago, Ill., Ventura, Calif., Cleveland, Ohio, Toledo, Ohio, Ypsilanti, Mich., Detroit, Mich., and Tucson, Ariz. In most of these locations, the plan is to develop the business gradually and to add to the inventory of molds and other equipment after markets are established, first, for roof slabs, and volume of sales is thus secured to finance further expansion. National advertising in trade papers has been conducted, which has been directed to reputable concrete masonry producers.

General

Basalt Rock Co., is without question one of the most aggressive merchandisers in the concrete masonry industry and has built up a large and substantial volume of business which surpasses anything in the West. The company gets its name from its beginning, when incorporated to produce crushed stone from basalt rock at Napa. The company is a substantial producer of sand and gravel and ready-mixed concrete in the Bay area of San Francisco, one of the largest suppliers of rip-rap anywhere, a producer of asphaltic mixes and has its own steel plant which was constructed during the war originally for building barges and ships. Many naval vessels were constructed and repaired in this plant during the war. The steel plant has now been converted to manufacture welded steel pipe, tanks, well casings and other products. Basalt also is a distributor of fuel oils, road oils, oil burners and other products.

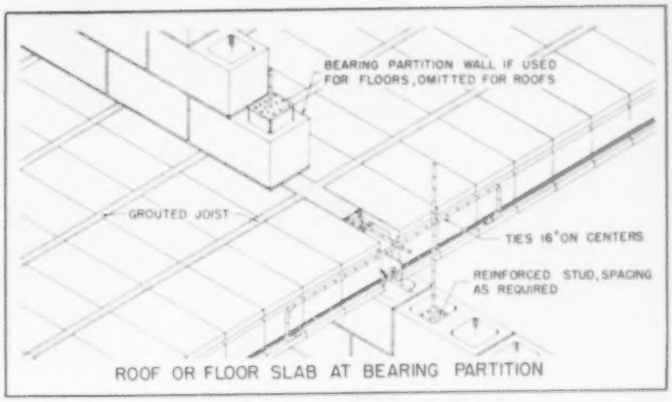
"Basalite," which is the trade mark for the standard line of concrete products, was coined at the time of the San Francisco Fair in 1939, when the company built and displayed its "Basalite" concrete masonry home.

From that as a beginning, the concrete masonry business gained impetus and the trade mark "Basalite" became a by-word in California, through advertising and a sustained program of merchandising. At Napa, the company has three Besser Vibrapacs. New plants were built during the past several years at Stockton in central California, with two Bessers, and at Ventura in southern California where two similar machines are operated. The company is selling its products in a territory from Kern county in the south, throughout California and north to the Oregon state line. Products from the Ventura plant are merchandised by the Rocklite Division. Pumice and Rocklite lightweight aggregates are produced by the company in its own plants.

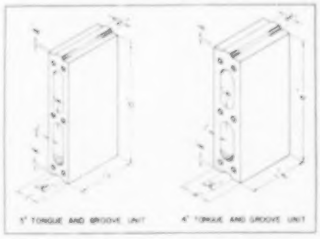
Some 160 shapes and sizes of units are being manufactured including many special shapes like watering troughs, silo staves, etc., and they are widely advertised. The company has engaged an advertising agency and is a steady advertiser in leading trade magazines throughout the range of its sales territory.

A. G. Streblow, president of Basalt Rock Co. and a member of the board of directors of N.C.M.A., is the guiding force who has inspired the ideas and built the company from one with a single product to the well diversified, substantial status it occupies today.

E. F. Brovelli, secretary-treasurer, who has been associated with Mr. Streblow for many years, is a director of the National Sand and Gravel Association. M. McIntyre is general sales manager, assisted by C. W. Gillies. D. O. McCall, chief engineer, has played a large part, along with Mr. Streblow, in the development of Strestcrete. H. A. Price is sales manager of the Strestcrete Division and Jeff Kay is superintendent of production at Napa.



Detail of typical slab installation in a building



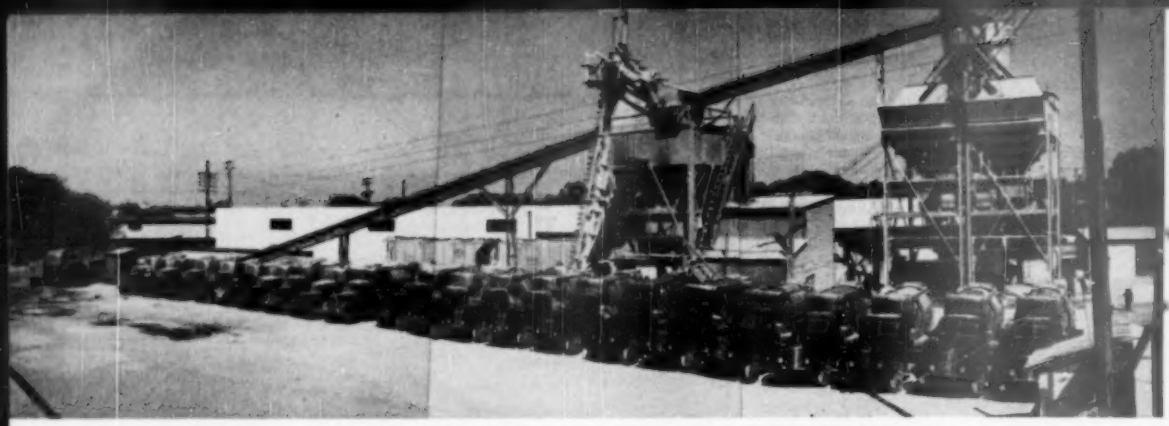
Details of conventional units for wall construction

Ready-Mix Safety Contest Winners

RESULTS of the National Ready Mixed Concrete Association's 1949 safety contest have been made public. The winning company in Class A (companies producing more than 40,000 cu. yd. of concrete during the contest period from July 1, 1948 to June 30, 1949) is Kuert Concrete, Inc., South Bend, Ind. This company had no injuries to employes or to non-employes and had only one property damage accident during the contest period. The winning company in Class B (companies producing 40,000 cu. yd. of concrete or less during the contest period) was Modahl and Scott, Inc., Bloomington, Ill., which had an accident-free record during the contest period.

Eight other companies in the smaller plant competition also had accident-free records and were given honorable mention. They are: Builders Concrete, Inc., Muncie, Ind.; The Trumbower Co., Nazareth, Penn.; Mesaba Construction Co., Hibbing, Minn.; Randecker Brothers Co., Lock Haven, Penn.; Wolff Ready-Mixed Concrete Co., Logansport, Ind.; Grand Junction Building Materials Co., Grand Junction, Colo.; Grand Haven Ready-Mix Concrete Co., Grand Haven, Mich.; and Portland Sand and Gravel Co., Portland, Penn.

A total of 104 companies submitted reports for this year's contest. These companies produced 9,071,651 cu. yd. of concrete during the contest period.



Overall view of plant with twin batching plant right. Note company truck crane, extreme left of line of equipment

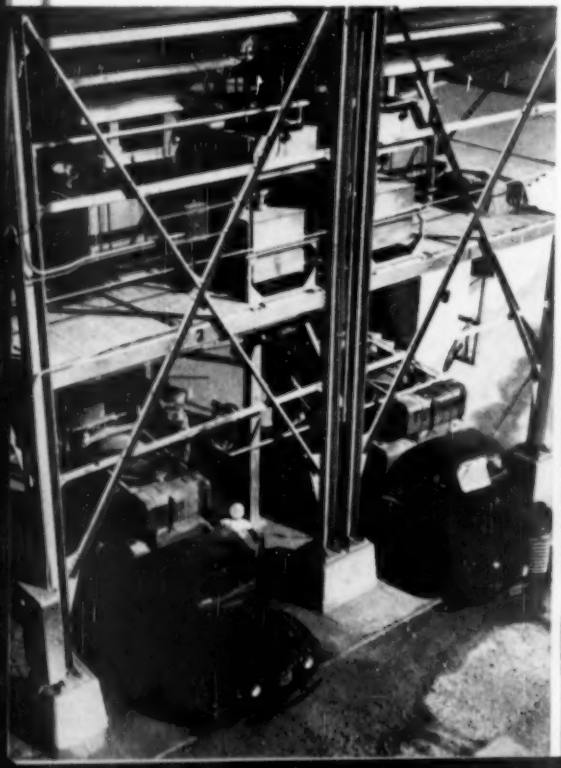
Accurate Batching of Concrete Materials

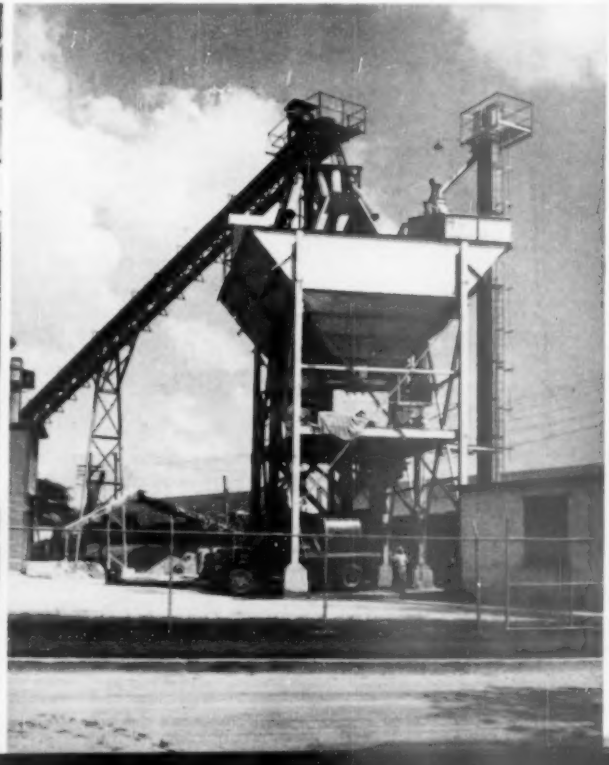
Ready-mix plant of Turner Gravel Co. has electrically controlled automatic scales and features design details for high-speed operation

A READY-MIXED CONCRETE plant designed to obtain speed and accuracy in batching, and featuring a unique revolving turnhead for selection of aggregates bins and other details for efficient and accurate material handling and batching, is being operated in San Antonio, Texas by the Turner Gravel Co. The installation actually consists of two complete batching plants erected side by side. Each plant has four aggregate compartments, two of 50-cu. yd. capacity and two of 25-cu. yd. for a total of 300-cu. yd. of aggregate. Each plant has a 63½-cu. yd. compartment for cement, providing for a total overhead bulk storage of two carloads.

All the aggregates bins are fed by a 24-inch belt conveyor on 225-ft. centers. The belt discharges the ag-

Looking down on truckways of twin batching plant, left, and side view of plant showing aggregate belt and cement bucket elevator, right





Roy N. McCandless, president, center, with L. Maurice McCandless, secretary, treasurer, left, and Alfred B. Lanford, general manager, seated in company office. To right: Dispatcher Sidney Lanford, surrounded with public address microphone and pneumatic tube station, left

gregate into a revolving turnhead, illustrated here, that can feed any one of eight directional chutes. A control panel is situated on the ground at the foot of the conveyor. The operator can select the bin to be fed by pressing the numbered button corresponding to the proper bin. A pilot light indicates the position of the turnhead at all times. Since aggregate is hauled only 8 miles from the company's gravel plant, no inventory is required beyond bin capacity. Haulage units for sand and gravel are 4- and 5-cu. yd. dump trucks.

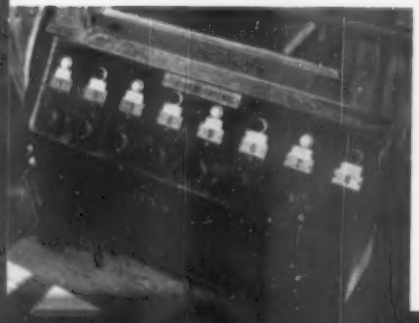
The two units of the plant permit simultaneous batching and loading of two mixer trucks. All 27 trucks operated by the company can be batched in 45 minutes in the morning for the first loading. That vindicates the company's claim for speed, which is necessary to raise the firm's sales volume to $1,000,000 a year. Accuracy of batching is secured by centralizing all batching controls between the two plants and using automatic scale equipment. The close grouping of the controls permits operation by one man, if necessary. All water is weighed on electrically controlled automatic scales. Batching of cement and aggregates also is entirely automatic. Cement is weighed, a rotary vane feeder and two-speed screw transporting the material to the weigh hopper.

A dispatcher's office is located at the entrance to the area and commands full view of the area. The office is air-conditioned. Delivery tickets showing job address, size of load and type of concrete ordered are prepared in advance, so that as a truck enters the yard, the dispatcher lists the truck number and driver's initials on the ticket and sends it to the batching plant through a pneumatic tube system. The batch operator then has a written order to follow, a practice which has minimized errors. After the batch is weighed the ticket is given to the driver. A public address system is available to the dispatcher for issuing special instructions to drivers. A visible card file record is kept by the dispatcher, showing the truck number, driver's initials, time loaded and size of load. A separate card is used for each job. The large volume of business in the dispatcher's office is handled by three telephone clerks. In addition to the pneumatic tube system, complete telephone in-

(Continued on page 222)

Top of plant, showing turnhead arrangement and open-top bins for aggregate storage

Point at which belt conveyor discharges to turnhead. Latter is spotted electrically by push buttons at ground level



Remote control station at ground level for turnhead spout selection

Part of the company's colorful "Rainbow Fleet" lined up in the yard

Builders Supply Corp. has grown to one of nation's largest producers of lightweight units in space of five years. Has modern plant and is supplying all types of construction projects

Concrete Masonry Booms in Phoenix

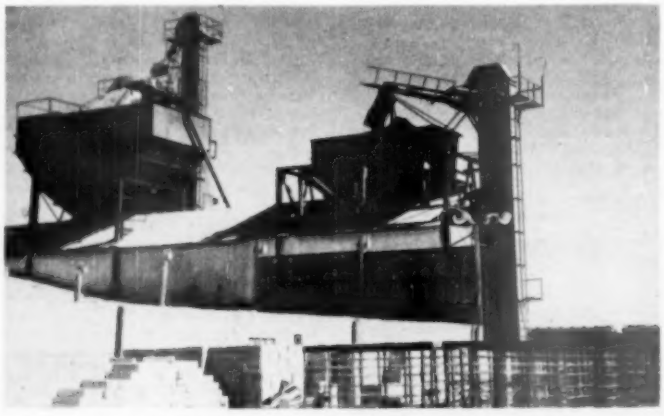
PHOENIX, ARIZONA, isn't a large city by Eastern standards, nor is it an industrial center, but it is experiencing remarkable growth, and it is noteworthy that concrete masonry is figuring largely in nearly all types of new building. The city is in desert country with very little rainfall, and its climate is making it more and more popular as a resort center and as a desirable place in which to build homes and settle down. So, it is in resort and home construction and the building of churches, stores and other commercial buildings that the largest market exists for concrete masonry construction.

Phoenix has been building so rapidly that it has the appearance of newness and freshness that goes along with a "young" city. Like many other southwestern and western cities, the architecture is modern, and smaller units than the 8- x 8- x 16-in. size which is standard in most sections of the United States are preferred. The "standard," if there is one, is 8 x 4 x 16 in., which comprises 90 percent of the concrete masonry units sold. Generous use is made of exposed concrete masonry walls, in ashlar patterns also, to develop pleasing architectural effects. There are no basements in the houses and partly for the very good reason that there are only a couple days of heavy rainfall throughout an entire year. Due to the infrequency of rains, there are no storm sewers and anyone unfortunate enough to have a basement would be in for trouble.

Per capita consumption of concrete masonry units in Phoenix and its environs, with a population of approximately 135,000, appears to be well over the average for the nation but this condition has existed only during the past few years, during a period of accelerated population growth and expansion to which was keyed an aggressive selling campaign for concrete masonry. Today, the demand is for some 15 million concrete block and brick per year from one plant, operated by Builders Supply Corp. This plant has three Besser Vibrapac block machines and operates around the clock on a three-shift program. A small percentage of the units is shipped to Flagstaff, Mesa, Prescott and other small cities in Arizona and some units have, on occasion, been shipped into southern California.

Builders Supply Corp. was incorporated in April, 1944, by Roger C. Thomas, Paul M. Thomas and Gilbert E. Olson, none of whom had had previous experience in this industry. The Thomas brothers have been operating a successful super service station in Phoenix and Mr. Olson has a background of 25 years in the construction industry. They visualized a coming building boom and decided that concrete masonry had a bright future if its use could be successfully promoted to architects, contractors and builders. Lumber is scarce in Phoenix and the principal competition to be met was units made from the low-grade clay available locally.

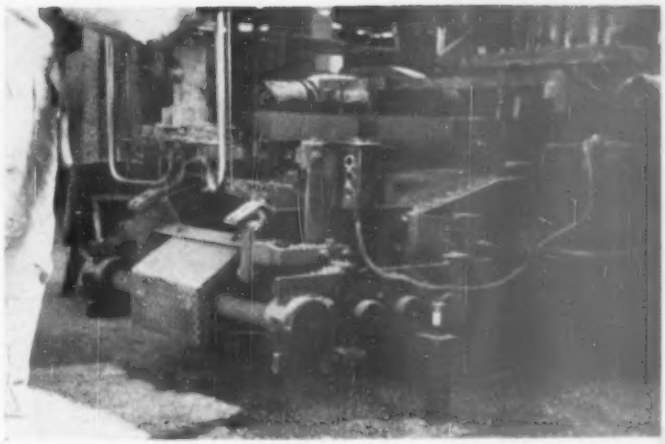
A plant was established in an abandoned lumber yard and the first units were of heavy aggregates made on a second-hand Anchor tamping machine.



Aggregates and cement are stored in overhead bins

Concentration was on building a demand among many architects and builders who had had no previous experience with concrete masonry. After a period of reasonable progress, the company secured pumice deposits as a source of lightweight aggregates for concrete masonry units and began an accelerated program of merchandising, backed up by test data, to exploit the lightness in weight, insulation values, fire resistance, soundproofing and other virtues of pumice concrete units. Ninety-five percent of the units sold today are of pumice aggregate, under the trade name "Superlite Cast Pumice Stone."

The success with which the product was merchandised has been proved by the need for establishment of a plant with three Vibrapac machines, which are hard put to supply the demand when operating three 8-hr. shifts. Total production in this plant is approximately 60,000 units per day exclusive of brick, sufficient to build 25 houses a day. It takes one- and one-half cars of bulk cement and six of pumice a day to keep the plant going.



As carrier is inserted under pallet with block, a dog trips circuit and empty pallet below carrier drops on conveyor and travels to back of machine

Markets

Concrete masonry construction is evident throughout Phoenix and the variety of types of construction for which masonry is used is impressive. Possibly 70-80 percent of the volume sold is for home construction, calculated as they do in Phoenix on the basis of square footage of floor area. Architects specify pumice concrete units of modular sizes for some 90 percent of all the finer homes built in the $30,000 to $100,000 price range. In this class of construction, 70 percent of the houses are of exposed concrete masonry.

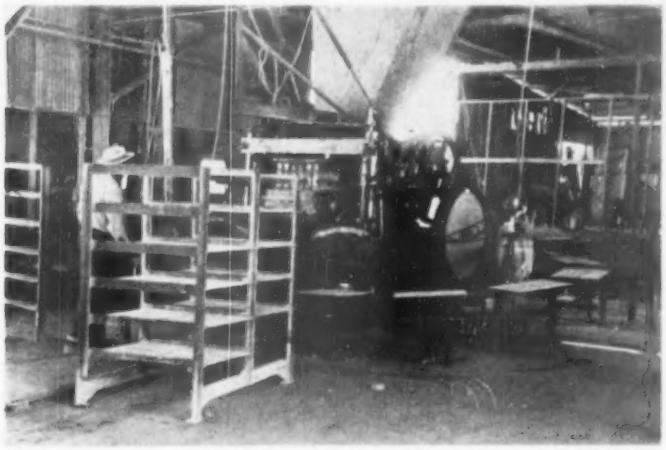
School boards specify the units for their insulation value and other desired properties, and other classes of construction utilizing pumice masonry include churches, resorts, apartments, offices, stores, hospitals, industrial buildings, theaters and hotels. A considerable number of buildings are of exposed masonry and there are many, including churches, of coarsed ashlar pattern.

Among large volume jobs are public and private housing and resorts and hotels. Recent construction for an addition to the Westward Ho Hotel, Phoenix's finest commercial hotel, and the famous Camelback Villa resort was of pumice concrete masonry. Pumice fill is used in the core spacings in some walls and Durawall mortar reinforcing is specified for many homes.

Phoenix has hot summers and many of the building tradesmen move out to cities of higher elevation north of Phoenix during the high temperature months, which reflects in the seasonal distribution of pumice concrete masonry units. During those months, there is greater volume of units shipped outside Phoenix into those communities in which itinerant tradesmen are active. Within the city itself, school and commercial construction is most active during the summer months.

Recently, merchandising efforts are being expanded to build markets in the construction of dairy barns, granaries, cotton seed storage buildings, deep freeze plants and motels.

As stated earlier, the largest volume is of 8- x 4- x 16-in. pumice concrete units, which are of 2-core design. However, the company manufactures 65 sizes of units, of which 30 are made from heavy aggregates. Among the more commonly used sizes are 8 x 8 x 16 in., 12 x 8 x 16 in., 12 x 4 x 16 in., 8 x 4 x 12 in., 6 x 4 x 16 in., 8 x 4 x 16 in. and 6 x 4 x 12 in. Partition block of 4 x 4 x 16 in., and 4 x 4 x 12 in. sizes are manufactured, as are 4 x 2¼ x 15⅝ in. Roman brick. Superlite units are made for patios, partitions, floors and roofs in addition to outside walls.



Earlier arrangement for pallet return to machine magazine consists of roller conveyor

Merchandising

Builders Supply Corp. employs seven field representatives in the territory who principally call on contractors and architects, not just as salesmen but to offer advice and cooperate in arriving at the best plans for construction. This is part of a policy of maintaining active cooperation with architects and contractors in developing new uses for, and new ways of using, Superlite construction.

The sales promotion program is thorough and covers all potential sources of business. An educational program, which includes literature and advertising, is directed and without letup toward prospective home owners and builders. In all literature and advertising, the words "Superlite Cast Pumice Stone" are emphasized. Use of photography is proving a powerful sales tool in selling pumice concrete masonry to government agencies and architects. Policy is to photograph all sizable and representative or new types of jobs and

Prescott, Arizona, Monday, February 7, 1949

SUPERLITE PUMICE

BRICKS and BLOCKS

Superlite pumice is approximately 30% lighter in weight than other masonry materials.

Lightweight! strong! durable!
fireproof! soundproof!
Insulating! waterright! flexible!
low cost! low upkeep!

Everything for the builder . . . except lumber!

Aluminum Garage Doors — Overhead retractable type. Only $40.50 complete.

Lupton Steel Sash — The only modular steel sash in the southwest.

Premier Aluminum Sash — No putty, no paint, no rust. Weather-tight, long-lasting.

Builders' Hardware — Knob-set locks. Tote locks. Wrought iron door sets.

Steel Lintels

Heatilator Fireplaces

Special Attention to Mail Orders

BUILDERS SUPPLY CORPORATION

1800 N. Central Ave. — Phoenix - Ph

Prescott, Arizona, Monday, March 21, 1949

SUPERLITE PUMICE

BRICKS and BLOCKS

Superlite bricks and blocks can be sawed and nailed. They take plaster and paint direct.

Lightweight! strong! durable!
fireproof! soundproof!
Insulating! waterright! flexible!
low cost! low upkeep!

Everything for the builder . . . except lumber!

Aluminum Garage Doors — Overhead retractable type. Only $40.50 complete.

Lupton Steel Sash — The only modular steel sash in the southwest.

Premier Aluminum Sash — No putty, no paint, no rust. Weather-tight, long-lasting.

Builders' Hardware — Knob-set locks. Tote locks. Wrought iron door sets.

Steel Lintels

Heatilator Fireplaces

SPECIAL ATTENTION TO MAIL ORDERS

BUILDERS SUPPLY CORPORATION

1800 N. Central Ave. — Phoenix, Arizona

Prescott, Arizona, Monday, April 11, 1949

THE YUMA DAILY SUN — Yuma, Arizona — Monday, April 11, 1949 — 5

SUPERLITE PUMICE

BRICKS and BLOCKS

Superlite has the FIRE RESISTANCE of pumice (fusing point, 2,450° F.) . . . its pumice content gives Superlite six times the INSULATION value of standard sand-rock concrete.

Lightweight! strong! durable!
Fireproof! soundproof!
Insulating! Waterright! flexible!
Low Cost! Low Upkeep!

Everything for the builder . . . except lumber!

Aluminum Garage Doors — Overhead retractable type. Only $40.50 complete.

Lupton Steel Sash — The only modular steel sash in the southwest.

Premier Aluminum Sash — No putty, no paint, no rust. Weather-tight, long-lasting.

Builders' Hardware — Knob-set locks. Tote locks. Wrought iron door sets.

Steel Lintels

Special Attention to Mail Orders

Heatilator Fireplaces

BUILDERS SUPPLY CORPORATION

2800 N. Central Ave. — Phoenix, Ariz.

BRICKS, BLOCKS and AGGREGATES

Send for illustrated booklet describing Superlite pumice . . . the ideal lower cost, all purpose masonry material . . . over 50% lighter . . . over six times the insulation value. Comes in bricks and blocks . . . more than 20 modular shapes and sizes. Can be sawed, nailed, plastered and painted direct. Aggregate available in graded for for lightweight pouring. Superlite pumice meets ASTM requirements. Exceptionally high crushing strength. Mines and process plants in California and Arizona assure prompt delivery throughout the West. Estimates furnished for your specifications.

SUPERLITE CORPORATION
P.O. Box 178, Calipatria, California
Please send me, without obligation, your Superlite pumice booklet.
Name
Address
In Phoenix: Builders Supply Corporation, 1800 N. Central Avenue

to key these photographs for use in selling similar jobs.

Dealer organizations are the outlets in other cities, like Yuma, Flagstaff and Prescott, which are supplied units either by rail or truck from Phoenix. Recently, a new office and storage yard was established at Mesa, which is a small city 20 miles east of Phoenix in a rapidly developing agricultural area. Establishment of this service was given publicity through paid advertising in the Mesa newspaper.

Advertising is prominent in the market-building program and the firm is a regular and substantial buyer of space in newspapers and trade magazines. Advertisements are placed every Monday and Tuesday in local newspapers, and campaigns are conducted at times in the newspapers of other cities within the company's market area, carrying copy directed to prospective home builders and contractors. Usually, a planned and specific campaign will consist of a series of advertisements, each of which is illustrated to put over one particular advantage of pumice concrete units. The series will cover all the desirable properties of this construction.

Advertisements are placed with regularity in *Architectural Record* and *Arizona Builder and Contractor* in order to reach the architects and contractors for large buildings and prospects. Advertising Associates, local advertising agency, handles the advertising program. Various information booklets are published, some for distribution at exhibit booths which the company rents at state, county and building shows. The advertising agency is presently preparing a special mailing piece for distribution to farmers and ranchers to develop business in the construction of barns, dairies, silos and other farm buildings. A monthly publication is designed to keep architects, contractors and builders posted on improvements and new uses for Superlite masonry.

Advantage is taken of every opportunity to publicize the company and many articles have been run in the newspapers and trade magazines serving architects and builders, detailing progress in plant expansion, new methods, etc. which are of interest to readers.

One interesting item to help build sales is a tablet of small lead slips which is given all employes and made available to their families and friends. Heads on the slips make it easy for the holders to jot down information such as where digging for foundations has been observed, rumors of new building activity, who to contact about such and such a job, etc. These slips are intended to be handed to the sales personnel.

One unusual advertising stunt is in the painting of delivery trucks. The company owns eight International trucks which haul an average of 1400 8- x 4- x 16-in. units to the load and, in addition, requires the services of leased trucks. Some of them pull a full trailer and have 3000 units to the load. To attract attention, each of the company-owned trucks, salesman's cars and trucks on regular lease has one side painted highway yellow from the grille in front all the way to the back bumper. The other half is painted some other bright color and no two are alike.

Opening pumice pit at Calipatria, Calif.

LEFT—
Advertisements shown here comprise part of a regular campaign run in local newspapers. Each insertion stresses one particular advantage of pumice concrete units. Following ads play up other desirable properties

Upon arrival at job site, ramp of self-unloading truck is lowered and front end of trailer raised, causing load to roll off unit to ground

Aggregates

Builders Supply Corp. owns pumice deposits at Williams, Flagstaff, and Vicksburg in Arizona. Processing consists of reduction through roll crushers, screening and shipment in hopper cars to the plant in Phoenix which has a siding on the Santa Fe tracks. With opening of a new pumice operation near El Centro, Calif., which has a capacity of 30 cars a day, the company expects to supply the aggregate to other users.

Plant

The plant is located on an eight-acre tract at Six Points which is in the industrialized section of Phoenix and not far from the heart of the city. It is a bulk cement batching plant with overhead aggregates bins and concrete mixers served by a traveling weigh batcher on the floor above the block machinery. Bin capacity consists of two bins that hold 30 tons of heavy aggregates each, two of 40 and 60 tons capacity for sized pumice aggregates and bulk cement storage for 2000 bbl. All materials are delivered by rail.

At the plant, pumice is put through roll crushers in two stages and screened to a ⅜- x No. 4 coarse size and minus No. 4 fines, which are elevated separately into bins. Cement is handled in the conventional manner, with rail hopper and a screw conveyor feeding a vertical bucket elevator. Standard portland cement is used exclusively and either Darex or Vinsol resin is added in the mixer for plasticity. Each of three mixers over the respective Besser machines is 50 cu. ft. capacity. Other production equipment consists of a Dunbrik brick machine and a Duntex roofing tile machine.

Curing is done in 16 steam curing kilns at a top temperature of 180 deg. F., using a combination of live steam and radiated heat. Steam is supplied by two 100-hp. gas-fired, high pres-

(Continued on page 224)

Bulk cement bucket elevator, left, and 24-in. belt conveyor on 251-ft. centers for aggregate delivery to overhead bins, right, at central mix plant of ready Mixed Concrete, Inc.

A common sense approach to selling, emphasizing service, facts and courtesy, increases business and reputation of Ready Mix Concrete, Inc., Mansfield, Ohio

By L. DAVID MINSK

Building Ready-Mixed Concrete Volume THROUGH SOUND MERCHANDISING

RESULTS of an aggressive marketing campaign by Ready Mixed Concrete, Inc., Mansfield, Ohio, have taken the form of a new $150,000 central mix plant. Quality control is the first concern of Herb Rusk, president of the company. With this control adequately supervised, the company's next concern is to sell the concrete and to provide service to ensure its proper use.

Mr. Rusk firmly believes in publicizing his ready-mixed concrete. One of the most important links in this campaign is the direct mailing of literature. A local printing and duplicating concern handles the preparation and mailing of monthly bulletins and supplementary data provided by Mr. Rusk. Three mailing lists reaching specialized groups are utilized: one for contractors, one for farmers and one for architects and engineers. Contractors are first presented with a loose-leaf notebook binder on the cover of which is inscribed the company's name and the title "Reference Handbook." Literature from the Portland Cement Association, American Concrete Institute, National Ready Mixed Concrete Association and other organizations is then sent, punched with holes to fit in the notebook. P.C.A. literature is sent to farmers, whereas architects receive A.C.I. standards books.

The monthly bulletins are sent to all on the three mailing lists. These bulletins may be a promotion for a curing compound or a statement of the plant mixing control. One time when Mr. Rusk found a general lack of knowledge regarding the consistency of mixes desired by customers, a monthly bulletin describing the slump test proved helpful. Newspaper ads also are used to describe the advantages of concrete under close control and to describe its proper use. Although the company supplies its friends with scratch pads, lead pencils, key cases and pen knives, the president feels that the best advertising is a clean, well-painted truck driven by a white-uniformed driver. These command attention on the city's streets and can be the source of much favorable comment.

Each of the company's truck drivers and plant employes is furnished with white coveralls on which a large plaque with the name "HERB RUSK —Ready Mixed Concrete" is sewn on the back. The man's name is embroidered on the front of the uniform. The cost of uniforms sufficient to provide for four changes a week is borne equally by the company and the employe. The appearance of the trucks is kept clean and neat by spraying the agitators with a mixture of fuel oil and clear paraffin oil each morning, thus preventing cement dust and wet concrete from adhering to the body. At the end of the work day a high pressure jet of water pumped from the company's deep well is used to wash off the dusty coating.

Shortly after the new plant was put into operation, an open house was held to acquaint visitors with the mechanics of making concrete. Over 150 people visited the plant at that time, including contractors, architects, engineers, state highway, city and county officials, and bankers. A printed sheet was made available describing the new equipment, listing manufacturers, dimensions and interesting points about the plant. Credit was given on this sheet to local concerns that furnished some of the equipment and assisted in presenting the open house.

The company realizes that the truck drivers and their equipment may be the avenue to increased business. Conversely, if they do their job poorly it may mean lost business. To increase their potential usefulness, Mr. Rusk awards prizes to the driver who keeps his truck the cleanest or who is the most courteous. When the drivers were told that a prize would be awarded to the first driver to be complimented by a contractor for his courtesy, two wrist watches had to be given as the result of almost simul-

taneous compliments. Quizzes based upon the American Concrete Institute *Concrete Primer* (issued to the men) are given the drivers frequently, for which prizes also provide an incentive. Drivers also carry with them a "concrete quantity calculator," a pocket slide rule which enables them to answer many customer's questions regarding the quantity required for a particular job. It also aids in avoiding disputes as to the proper amount furnished, Mr. Rusk reports. By these contributions, the employes are in a very good position to conclude a sale oftentimes while out on a job, at the same time knowing job limitations.

A monthly meeting of all employes is held to discuss mutual problems. Employe's suggestions for improving the company's efficiency or for making the individual jobs more pleasant are discussed. These meetings have resulted in the adoption of many ideas benefiting the entire organization. Employe turnover at the plant is very low, evidencing a high level of morale.

Producing Quality Concrete

Sales technique would be difficult without a good product to promote. The Mansfield firm's new plant provides the tool for this close control of quality that the company stresses, from selection of materials to the pouring of the job. This unit is a Johnson "Octo-Bin" with a 2-cu. yd. Koehring mixer. Six bins of 400-cu. yd. total capacity provide three different sizes of gravel, two types of sand and one of limestone for a wide variety of mixes. The center of the Octo-Bin is a 500-bbl. two compartment cement bin. An additional 1032 bbl. of cement are stored in a ground silo adjoining. Aggregate is raised from ground level to the bins by a 24-in. Barber-Greene conveyor on 251-ft. centers inclined 18 deg.

Mixer Operation

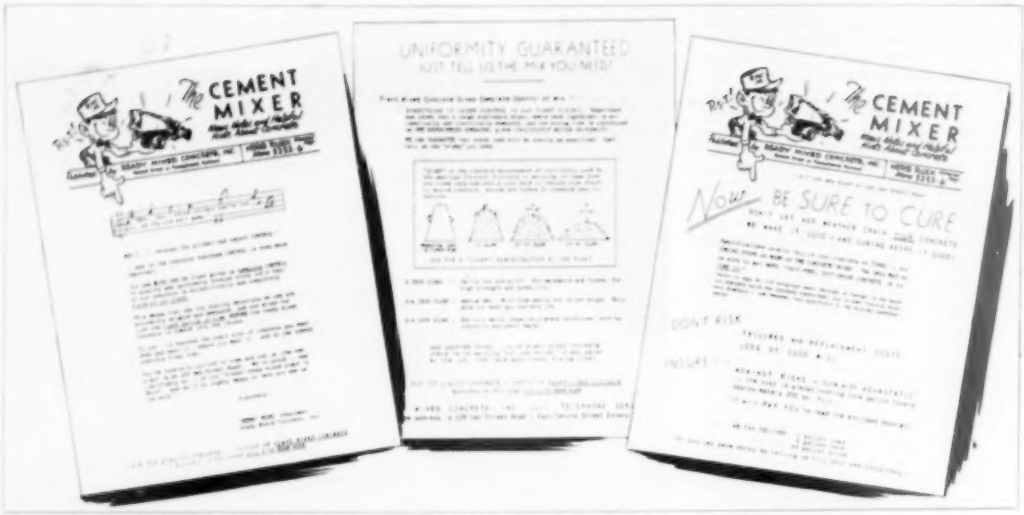
The mixer discharge hopper furnishes a quick means of making a visible check on each mix. If there is any doubt regarding the quality, the load is dumped, usually on the plant area to form part of the roadway. A central mixer was chosen because it was felt greater control could be achieved, according to Mr. Rusk. The company claims that delivery costs have been reduced markedly since the start of central mix operations, for it is possible to haul a 50 percent larger load in the mixer trucks operated, using them as agitators only. Thus six trucks now do the work formerly done by nine. Furthermore, contractors formerly had to wait long periods between arrival of successive loads. That waiting period has been reduced considerably. This is a direct saving to the contractor also, for it reduces down time and overtime, a factor he will take into consideration when reordering concrete.

Standard portland cement is used and Darex added at the mixer for most orders. The operators feel the greater expense involved in adding the air-entraining agent at the mixer is warranted by the more uniform consistency resulting. The air-entraining agent is pumped from a drum on the ground level to the weigh room by means of an Eastern Industries pump driven by a ⅓-hp. motor. Storage and mixing of a 2 percent calcium chloride solution for admixture during cold weather is handled in two large vitrified tile tanks sunk in the concrete floor of a small concrete block building below the batching plant. A wall-mounted Gorman-Rupp acid-proof pump forces the solution to a supply tank over the water batcher on the floor above. From here the solution is gravity-fed to a measuring dispenser built locally. The pumps are self-priming and need no attention. Electric valves automatically proportion the air-entraining agent, cement and water. Aggregates are weighed manually. An electrical lock prevents emptying the mixer before a specified time set on a timer has passed.

For pours during the winter months a 60-hp. Heggie-Simplex boiler, stoker-fired with coal, is used to generate steam for injection into the aggregates bins and to heat a 500-gal. water storage tank. Thermostatic controls are completely automatic. For severely cold days a separate Bell & Gosset booster heater installed in the line handles the heavier load. A hot and cold water blending system is used whereby the operator can batch water at any desired temperature simply by watching a thermometer in the 2-in. line feeding the water batcher. Using the temperature data of the aggregates bins, the temperature of the water necessary to produce a mix at

Transfer belt from rail and truck hopper, left, dumps aggregate to main plant belt, right. Clamshell, background, is used for stockpiling or loading to belt

Line-up of company equipment includes drum-type agitator bodies from 3- to 4½-cu. yd. capacity, and near end of line is one 3-cu. yd. non-agitating concrete delivery body



Examples of monthly bulletins Ready Mixed Concrete, Inc., sends to all on the mailing lists. Center bulletin was sent when company found customers did not know the kind of concrete desired; bulletin pictured on the right promoted a curing compound. Heads of the bulletins are colored in red and blue; the text is mimeographed

a specified temperature can be computed from a chart. The effectiveness of hot mixing was shown when, on a recent cold weather haul, the mix cooled 5 deg. (from 103 to 98) in a 14-mile haul requiring 45 min.

The company uses the services of a reputable testing laboratory to set up the design of each mix and take careful daily checks on moisture content of aggregates, slump, yield, etc. Air entrainment is checked several times daily by means of an Acme Air Meter. Air content is held within close limits, preferably at 4½ percent, ± ½ percent. The company claims this careful control is possible when the air-entraining agent is added at the mixer. Each mix is adjusted to compensate for the addition of entrained air. Test cylinders are made on the larger pours of each job and results are tabulated at both 7 and 28 days. On a recent job supervised by the Corps of Engineers, test cylinders showed consistently high strengths. A 5½-bag mix showed a 28-day strength of 4000-5000 p.s.i. The Mansfield firm has been successful in hauling ready-mixed concrete in non-agitated delivery equipment. Experiments with the Dumpcrete have indicated that well-proportioned concrete may be transported 5-10 miles with no apparent segregation. There is little difference in the slump from top to bottom of the load, Mr. Rusk states. Close control of aggregates grading and moisture content must be maintained at the plant to ensure this, however. A slump of 2-4 in. has seemed to work best in the company's experiments.

The plant generally uses only two men, one of whom is an unskilled worker for general work. When large pours are to be made, however, a crane operator is necessary for reclaiming from stock piles if rail shipments are irregular. All aggregates used are shipped in from Killbuck, Ohio, 45 miles away, and from Marion, Ohio. The mixing is left to one man. He can by-pass the mixer for dry batching in case of a paving job or failure of the mixer. The old batching plant formerly used by the company now serves to batch the small amount of lightweight aggregate ordered. Seven ready-mixed trucks are operated, five of which are new Internationals with 3- and 4½-cu. yd. Jaeger agitators. A 3-cu. yd. Dumpcrete is also used. Plant personnel include Ralph Jones, general superintendent and Henry L. Huber, assistant manager. Officials of the company, in addition to the president and general manager, Mr. Rusk, include Paul W. Endriss, vice-president; Herbert H. Schettler, secretary, and Juliet J. Rusk, treasurer.

Herb Rusk, president, right, talking to H. L. Huber, assistant manager, in front of company office

Seeks Concrete Pipe for Irrigation System

BIDS HAVE BEEN invited by the Bureau of Reclamation for furnishing approximately 117 miles of precast concrete pipe for irrigation distribution systems in the southern San Joaquin Valley of California. The procurement of irrigation pipe is being speeded to hasten delivery of water to lands in the valley where users are experiencing or approaching critical shortages from existing sources. Work also is being continued on a 41-mile length of the Friant-Kern Canal, which is to supply water to much of the San Joaquin Valley, and work is being initiated on another 17-mile section, according to L. N. McClellan, chief engineer of the Bureau. Other work he mentioned includes continuance of construction on 45 miles of the Delta-Mendota Canal and initiation of work on the final 51 miles to complete the canal, furtherance of the work on the Tracy Pumping plant, and commencement of construction on the Delta Cross channel at Walnut Grove.

Specifications for the precast concrete pipe include both standard irrigation pipe, ranging in diameter from 10 to 15 in., and reinforced pipe from 12 to 72 in. in dia. Part of the reinforced pipe is specified to withstand a pressure of 25 ft. of hydraulic head and the remainder, 50 ft. of head.

Add Air-Entraining Agents at Mixer

Greater control of quality of concrete claimed by this method as compared to use of air-entraining cements, based upon study of jobs and factors influencing properties of concrete

By J. A. NICHOLSON*

THERE IS a new ingredient in concrete. That ingredient is air. To produce durable concrete of proper strength, the concrete should contain purposefully entrained air, and the air content must be controlled.

The writer has processed and delivered approximately 375,000 cu. yd. of air-entrained concrete. In the first 300,000 cu. yd., air-entraining cement was used. In the remainder, the air-entraining agent was added at the mixer. There are two sides to every problem. The writer has had a great deal of experience with both sides of this particular problem. From our own work and from observations in many concrete operations all over this country, it is our conclusion that, whenever possible, the air-entraining agent should be added at the mixer due to the greater flexibility of control afforded.

This conclusion is so inevitable, and the dangers of absence of control so basic, that, in the writer's opinion, air-entraining cement should be used only when controls at the mixer are either impractical or impossible. Such opinion would limit the use of air-entraining cement to small projects where the expense of an automatic dispenser would be prohibitive, such as for farm construction, over-the-counter-sales, and similar examples.

Some cement companies have done an outstanding job in educational efforts to acquaint the far-flung building industry with many of the great advantages of air entrainment.

Cement from such companies will entrain controlled air under given conditions. Unfortunately, field conditions vary to such an extent that, even with the most uniform air-entraining cement, the control of the air, generally speaking, cannot be achieved. Constant air content for any set of conditions can be maintained only by adjusting the quantity of air-entraining agent added to the batch at the mixer.

The concrete industry should be deeply grateful to these cement companies for their splendid educational efforts. Through them, together with the work of many outstanding concrete technicians, government engineers, etc., a better concrete has been made possible.

On the other hand, in a limited number of cement plants, to a degree probably not realized by management (and probably as a result of recent cement shortages) some lax practices have been reported. Air-entraining cement has been infiltrated with normal cement. Silos, loading hoppers and bulk delivery units, supposed to contain one type of cement, have been contaminated with the other. Common conveyors have been used to handle both cements. Air-entraining cement that is under or over mortar air test requirements has been sold to dealers, ready-mixed concrete operators, and contractors without the consignees being advised of the facts, resulting in below minimum air content in some concrete or subnormal strength in other concrete.

Will the elimination of these and possibly other lax practices, coupled with the production of a certified uniform air-entraining cement, develop a condition where such cement can be used to produce controlled air results under all circumstances? I think not. However, you be the judge.

General Factors

Our first approach to the problem should be a consideration of the general factors that determine the air content of concrete.

Sand

1. Increasing the amount of sand will increase the amount of air.
2. Increasing fines in sand (30-50 sieve) will increase air content.
3. With coarse sand it is harder to entrain and hold air.
4. Manufactured sands generally require higher air content than natural sand — additional amount of air-entraining agent is generally required.

Coarse Aggregate

1. The larger the size, the less air required.
2. Type of aggregate affects air content.
   a. In stone and slag mixes, more air will be entrained than in similar gravel concrete mixes.

Cement

Air-entraining—the amount of air-entraining agent is fixed.

Standard portland—amount of air-entraining material easily adjusted. High early strength — additional amount of air-entraining agent must be used.

Type of Mix

Richness

1. Harder to entrain air in rich mixes than in lean mixes.
2. In rich mixes, a greater strength loss occurs.
3. In lean mixes, no perceptible loss in strength occurs.

Consistency

1. In wet mixes more air is entrained than in stiff, low-slump mixes.
2. Low-slump, high cement content mixes require more mixing time.
3. In wet mixes (over 7-in. slump), water tends to wash out air.

Air-Entraining Materials

Only two air-entraining agents have thus far achieved A.S.T.M. specification approval. In mixes of constant cement content and percentage of sand, air content will increase regularly with increase in the percentage of either one of these introduced.

Type of Mixer

Different mixers entrain different amounts of air, e.g., five transit mixers, using the same materials and the same mixing times, may entrain five different amounts of air. On each mixing unit, a standard mixing time schedule must be followed.

Length of Mixing Time

Generally, air content will be increased by lengthening mixing time which may be a factor depending on length of hauls. On long continuous mixing, air content eventually will be lowered.

Temperature of the Concrete

In rising temperatures, additional amounts of air-entraining agents are required.

Accelerating, Dispersing, and Retarding Materials

Air-entraining agents should be added separately when using such materials. If the stated general factors represent sound thinking, to what degree can a manufactured air-entraining cement (no matter how uniform) develop specified air content in concrete for the following customers?

1. Paving contractor—using concrete of 6-7 sack cement con-

*Nicholson Concrete Co., Toledo, Ohio

tent, reduced sand and 2 in. slump, coupled with fast mixing time.

2. Central (or transit) mixer operator — structural concrete 5-5½ sack cement content, increased sand, 3-6 in. slump.
3. Block manufacturer — concrete of very low cement content, and no slump.

In air-entraining cement (when uniform), the amount of air-entraining agent is fixed. How can it possibly fit the various field conditions affecting the air content of fresh concrete, as faced by these four customers? On a job where given aggregates are to be used, with air-entraining cement, air content may be altered only by lowering or raising the sand, and possibly the water content, and by a change in mixing time.

An air-entraining cement that will produce an optimum air content of 4-4½ percent in a pavement mix will undoubtedly produce structural concrete (excessive air) of low strength.

An air-entraining cement that will produce optimum air content of 4-4½ percent in structural concrete will not develop the required percentage of protective air in a pavement mix.

These statements stand even after taking into consideration possible changes in mix design and mixing time.

For the block manufacturer there simply would not be enough air-entraining material in the interground cement to develop even minimum air requirements.

Yet, constant air content for these three customers (and under any other set of field conditions) can be maintained easily by adjusting the quantity of air-entraining material added to the batch by an accurate automatic dispenser. (The author advocates the use of admixtures to make control more feasible, and assumes throughout that sand grading, mixing conditions and other variables are being taken into consideration—The Editor.)

However, it must be immediately admitted that most of the air-entrained concrete has been processed in which air-entraining cement was used. Further, it is admitted that concrete technicians are divided in their opinions.

Charles E. Wuerpel, an outstanding authority on concrete, has long advocated adding the air-entraining material at the mixer. (See *Civil Engineering*, November, 1946).

William Lerch of the Portland Cement Association has pointed out that additions at the mixer require either the installation of some automatic dispensing device or the services of a workman, with the ever present hazard of mistakes due to the mechanical or human element. He expresses the opinion that the use of air-entraining cements avoids these difficulties. I'm afraid it would take some arguing to convince me that cement companies couldn't be guilty of the same mistakes. And over our own mistakes in the field, we have more immediate control.

The greater use of air-entraining cement is due undoubtedly to the story of the development of air entrainment. In the disintegration of roads through peeling, scaling, etc., concrete was rapidly being discredited as a paving material. Natural cement, when added to portland cement, seemed to stop such disintegration. Investigation showed that such natural cements contained air-entraining materials.

For too long a time, the cement industry has seemingly been content to have air-entrained concrete considered only as a paving material. Few have seen fit to point out its many structural and economical advantages.

In this article we will consider the use of air-entrained concrete in a paving operation, at a central (or job) mixing plant, and through the eyes of a transit mixer operator. As air entrainment was originally used in road-building, we might as well first face our problem in highway construction.

In the pamphlet, "Current Road Problems," No. 13, dated September, 1946, issued by The Highway Research Board, the following statement is made:

> "Air entrainment in concrete can be secured either by the use of an air-entraining cement, i.e., a cement in which the air-entraining agent has been interground during manufacture, or by the use of an air-entraining material added to the batch at the time of mixing. It is possible also to use a combination of the methods. Each method has its advantages and disadvantages. . . "

That some air entrainment in concrete can be achieved by either method or by a combination of the methods is readily admissible. However, the writer does not believe that the use of air-entraining cements (except under certain specified conditions) will produce concrete of controlled air content; nor does the writer believe that the practice of combining the methods can be defended. Merely specifying that air-entraining cement shall be used in road construction is no guarantee that minimum air requirements will be met.

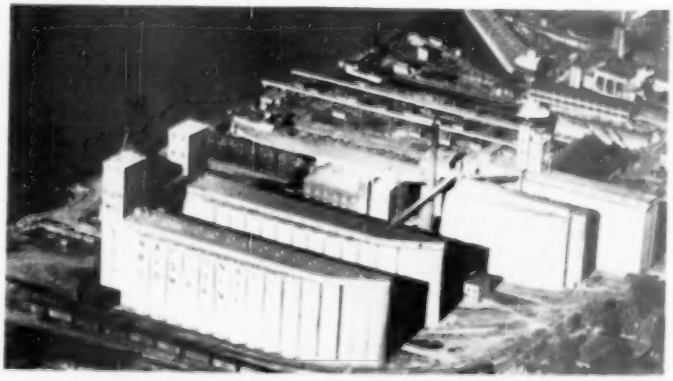
By the very nature of highway concrete—low slump, high cement content, reduced amount of sand, fast mixing time—all these characteristics call for an air-entraining cement on the high side of the A.S.T.M. Mortar-Air Test. In the early days of this test, the percentage limits specified by A.S.T.M. were 14 ± 4. Later they were changed to 16 ± 4 and now to 18 ± 3. Where they will finally wind up is anybody's guess. Actually, the percentage has been increased as the proportion of cement going into pavement use has increased. No one seems to be concerned as to what possible effects these increases will have on air entrainment in structural concrete.

Even now, using air-entraining cements passing the higher mortar-air (18 ± 3) requirement, the minimum air content of 3 percent in the finished pavement concrete has not always been met. Specifying air, and not getting it, will not make durable concrete.

A given cement may give a job the minimum air content early in the morning, yet later on in the heat of the day fall considerably short. In an Eastern paving contract, air content varied from 1½ percent to 8 percent with the same air-entraining cement. At one time, the concrete engineer was running back to the plant for more air-entraining material to be added by hand at the mixer. At another time, they were blending in regular portland cement at the job. Do such practices make for positive control of air content?

A given cement might entrain required air on a pavement mix where limestone or slag is used as aggregates, yet fail to entrain sufficient air in gravel (lower sand content) concrete pavement.

It is generally suggested on pavement work that when the cement fails to produce minimum air content, corrections be made by slightly increasing the sand and water ratio or by increasing the time of mixing. On many



Silos and building on this large Toledo job were of air-entrained concrete

paving jobs, all such changes in mix design (within specification limits) are made, yet required air contents are not reached consistently.

Problem: For a paving job the cement in use passes the mortar-air test. All other job specifications are met except that the concrete processed with the air-entraining cement fails to have 3 percent air.

What do we do: Shall we oversand the mix?

Shall we wet up the mix?

Shall we increase the mixing time?

If we finally get enough air by 9 a.m., what happens at 12 noon in a rising temperature?

Adding air-entraining materials by hand to air-entraining cement at the paver is poor practice, costs somebody money, cuts down mixer output and requires extra labor. The state or other agency already has approved the cement. Who stands the burden of these extra costs?

The writer has long believed that one of the basic reasons for concrete pavement failures has been the relatively short mixing time of stiff, harsh mixes and feels that longer minimum mixing times should be specified, and performance required.

We also have the feeling that strength requirements have been over-emphasized in the minds of highway engineers and that it is time, in the interest of durability, that a more plastic (added sand) concrete of optimum air content ($4\frac{1}{2}$ percent) be considered for pavement work.

Through use of the Camera Lucida (and other recent laboratory developments) tests on existing air-entrained concrete pavements that are beginning to deteriorate, highway engineers should easily be able to determine whether my suggestions in the foregoing paragraphs represent sound thinking. I am certain that such tests will show that air requirements are barely being met, or actually not being met.

The many failures in concrete pavement prior to the widespread use of air-entrained concrete should put the entire concrete industry on guard. Concrete from an original cost angle and from a maintenance cost angle is an ideal material for pavement. However, because of the many failures before the advent of air-entrainment, concrete was being discarded rapidly or questioned by a number of state highway departments.

Today, too many concrete pavements are being built that do not contain the optimum percent of air. Undoubtedly, too many pavements have been built that do not contain even the minimum protective percent of air. When such pavements fail, the blame, undeservedly so, is placed at the door of air-entrained concrete. The whole future of concrete in some areas as a paving material apparently depends on the presence of the required amount of air.

It is so easy to get controlled air—even optimum air. Why should present faulty practices be tolerated any longer?

Filling concrete buckets from non-agitating type body with air-entrained concrete

Everywhere engineers are becoming convinced that if the use of air-entraining cement is going to be permitted at all on a project, provisions such as the following should apply:

1. Uniform, well-graded aggregates must be available.
2. Mixes required must have common characteristics.
3. Only cement from one plant should be used at a time.
4. Checked with job aggregates and mix design, all of the cement (not the average) shall pass a strict mortar-air test requirement, say within four percentage points.

Even on a large Eastern government job (such work generally being done under ideal control conditions), I am informed that the contractor, who had bought approximately 300,000 bbl. of air-entraining cement from one plant, was told to add the air-entraining material at the mixer by an automatic dispenser. I am certain that the engineers on that project will agree fully with the opinions herein expressed.

To safeguard the future of air-entrained concrete as pavement material, these suggestions are made:

1. If automatic dispensing means cannot be made available, an air-entraining cement, of proved uniform performance under the given field conditions, should be used.
2. Short mixing practices (in and out) must be stopped. Wherever practical, mixing time should be controlled by an accurate timing device and minimum mixing guaranteed by a tamperproof recordograph.
2. Whenever possible, the air-entraining material, in proper amounts, should be added at the mixer by an accurate, automatic dispenser.

Transit Mixing

The writer believes, in commercial concrete operations involving mixes of many different designs, that quality controlled air-entrained concrete can only be achieved by adding the air-entraining material to each batch going into the truck mixer.

This procedure costs a few cents more per cubic yard. The additional benefits accomplished are worth many times the slight extra cost.

Equally important, strict controls must be enforced over the driver-operators as to water and mixing time. Unless these two factors affecting air content are rigidly controlled, the production of air-entrained concrete is strictly a hit-or-miss proposition.

The answer to the question, "Why do so many transit mixer operators (even in the northern states) avoid air-entrained concrete?", is not a proper part of this article.

However, many ready-mixed concrete operators constantly complain that air entrainment is not for them. They have experienced wide variations in air content, particularly in the upper bracket, with a consequent serious loss in strength. The use of air-entraining cement (designed primarily for pavement use) would (as seen under our discussion of general factors) tend to produce high air content. Actually, the problem is more basic.

In too many plants, there is too little knowledge or perhaps a slight acquaintanceship with general problems of concrete, no knowledge of the aggregates—gradation, fineness modulus, weight per cubic foot, moisture content, etc.,—and not the slightest understanding of the problems of air entrainment.

In such operations, the processing of controlled concrete (air entrained or otherwise) is an impossibility.

The purpose of this section of the article will be to make suggestions that will help make possible the proc-

essing of controlled air-entrained concrete. Companion problems of both transit mixing and central mixing will be discussed in the section dealing primarily with the latter.

Setting Up Air Control at the Plant

1. Determine proper mixes for different purposes. In the words of Stanton Walker and Delmar L. Bloem (National Ready Mixed Concrete Association):
   "In adjusting quantities of material to compensate for air, the best founded procedure is to maintain the same quantity of cement and coarse aggregate per cubic yard of concrete as for the normal cement by reducing the volume of water and the absolute volume of sand by an amount equal to the volume of air entrained."
2. Principally on the basis of fines in the 30-50 sieve classification of the sand, determine the approximate amount of air-entraining agent required.
3. Determine through use of mixing time studies, the amount of air actually entrained under given conditions.
4. For each major mix, establish the mixing time that approximates optimum air content. See to it that the driver follows instructions.
5. If fewer fines in the sand develop, use additional air-entraining material to secure optimum air content. If the sand gets on the fine side, reduce the amount of air-entraining material used.
6. Explain to each driver the relationships of water, mixing time and air entrainment.

On the Job

1. If the concrete has a stony appearance, additional mixing time is suggested. Notify the plant.
2. If the concrete has both a dry and stony appearance, add water when giving the load additional mixing time.
3. If the concrete looks like whipped cream, notify the plant, so that the amount of air-entraining agent might be reduced. Suggest to other drivers on the same job the possibility of shorter mixing time to eliminate excess air. Excess air produces low strength concrete that, with its added stickiness, will irritate the cement finishers.

Central (and Project) Mixing

Only recently I asked a ready-mixed concrete operator why he used air-entraining cement. He advised me that he was holding the cement manufacturer responsible for the accurate control of air. He further advised me that his concrete always contained 3 to 4 percent of air.

Several days later, I visited a central mixing plant where cement, from the same manufacturer, was in use. In one mixer load, concrete that was only supposed to contain sufficient water for 2-in. slump began to act like 6-7 in. slump concrete. I am certain that testing would have shown at least 10 percent air content. The added flowability came from the excess air.

This same load, mixed approximately 15 minutes (with all the appearance of whipped cream) was dumped into an agitator with another two cu. yd. batch which, having been in the mixer about half a minute, was barely preshrunk. The customer didn't fare very well on that deal.

In operations where a single air-entraining cement from one plant is used, the writer has observed consistent difficulty in keeping the air content between 3 percent and 6 percent. During the time that we used one air-entraining cement, records showed the air content generally to be between 3 percent and 6 percent with extremes as low as 2 percent and as high as 9 percent. Yet, some operators use five or six brands of air-entraining cement, and pretend they control the entrainment of air.

At our plants using an air-entrainment of the optimum air content (4½ ing agent, we experience no difficulty in maintaining control at ± ½ per-percent). In any operation using sand of fairly consistent gradation, controlled air content can easily be achieved where the admixture is added at the mixer, by means of an accurate, automatic dispenser. (See table)

Test No.	Slump	Air (%)	Test No.	Slump	Air (%)	Test No.	Slump	Air (%)
1	3 in.	4.5	11	3 in.	3.9	21	3 in.	4.0
2	3 in.	4.5	12	3 in.	3.9	22	3 in.	4.0
3	3½ in.	**	13	3½ in.	3.9	23	3 in.	4.0
4	3½ in.	4.4	14	3½ in.	3.9	24	3⅝ in.	4.1
5	3½ in.	4.5	15	3½ in.	4.0	25	3⅝ in.	4.1
6	3½ in.	4.0	16	3⅝ in.	4.0	26	3⅝ in.	4.2
7	3½ in.	4.0	17	4 in.	4.0	27	3⅝ in.	4.2
8	3½ in.	4.1	18	4 in.	4.0	28	3⅝ in.	4.2
9	3½ in.	4.1	19	3¼ in.	4.0	29	3⅝ in.	4.2
10	3½ in.	4.0	20	3¼ in.	4.1			

** No air test reported.
Specifications called for ⅝-in. topsize coarse aggregate, high early cement, 3-4 in. slump and 3-6 percent air content.
4-day strength average 2500 p.s.i.
7-day strength average 2683 p.s.i.

In central mixing plants, the wise operator will likewise provide instruments to determine both the moisture content of the sand and the slump of the concrete in the mixer. Through a determination of moisture the actual amount of sand is known. Through a determination of slump, the effects of concrete consistency on air content are properly regulated. Under our consideration of "General Factors," we have noted relationships of sand quantity and consistency with air entrainment.

From central mixing plants that are able to process concrete of controlled air content, deliveries of quality concrete (of optimum air content) and designated slump can be made in either agitators, rotating carriers or in properly built non-agitating units.

As a former transit-mixed concrete operator, I can say that central mixing controls over moisture content in sand, air content, and slump, are far more important than the type of delivery units used to haul the concrete.

At our Toledo operations, we now use non-agitators of the dumping type. These units, by moving the bottom concrete out first in dumping, correct hauling segregation and effect complete discharge. These same units did not work so efficiently when we were using air-entraining cement because there was too much variation in air content.

We have just finished a large addition to St. Vincent's hospital. Maquolo and Quick of St. Louis, Mo., leading designers of hospitals and institutional buildings, were the architects. Mr. Quick said: "The concrete was most consistent in strength, slump, and air content. The job is remarkably free of honeycombing and segregation. This is as fine concrete as we have had on any of our work." Mr. Quick's opinion is borne out by 29 consecutive reports from an independent testing laboratory making tests for the owner at the project.

What is especially pertinent about these figures is that the reports cover only concrete in which high early strength cement was used. Concrete technicians, everywhere, realize the difficulties that manufacturers have experienced in attempting to produce a uniform high early strength air-entraining cement. Yet, with automatic controls at the mixer, we experience completely satisfactory results. I am certain that practically all manufacturers will admit they do not want to make high early air-entraining cement. I am equally certain that many cement manufacturers agree with me that, when automatic dispensers are available, the air-entraining material should be added at the mixer.

Suggestions for Setting Up Air Control

1. Only cements of common characteristics (color, setting time, reaction to air-entraining agent, etc.) should be used from one bin. When practicable, use of one cement is advisable.
2. Determine proper mixes for different purposes.
3. Determine proper mixing time for different mixes.
   a. Central mixing—delivery in non-agitators (rotating carriers, dumpers)—easiest to control air—all mixing done in central mixer. For best

(Continued on page 222)

CONCRETE MASONRY UNITS MERIT A TRADE MARK

Geist uses identifying name to provide distinction for its products and advertises masonry units by trade name as foundation for aggressive merchandising program

By HAROLD GEIST*

Front of exhibit showing block detail. "Guy Stone" is character used in company advertising

WE IN THE concrete masonry industry are inclined to speak expansively of the strides taken by our industry, and by our individual plants, in the past decade. In those years our tremendous industry has grown from a backyard, hand-operated business to one with highly specialized mechanical equipment and commensurate investment. Plants now require hundreds of employes instead of a few.

Not only has the average size of plants increased, but the number of block manufacturers has doubled several times over. All this growth has served to point out one of the glaring weaknesses of our highly decentralized industry. We don't know how to sell.

Let us accept first the credit for being alert to opportunities which the current building boom created for us. During the war we were, speaking generally, classified as a non-essential business, using non-essential materials. We were therefore in a position to take from our traditional rivals—lumber and clay products—the building which would normally have gone to them. Lumber production was limited and its allocation carefully supervised. Furthermore the clay industry, brick and tile, had such a low price ceiling caused by its low wage scale that when labor tightened up it could not operate and compete for its normal quota of business.

When machinery was made available to the concrete masonry industry that was capable of manufacturing block at a rate commensurate with modern day demands for efficiency, the industry took the position that production was the answer to all ills. At the moment that was exactly the right answer, and we all marched forward, gathering strength as we went, but lacking very much purpose.

In our march forward we picked up an unenviable number of the inevitable get-rich-quick boys who stand on the sidelines of life ready to dart into the stream and grasp whatever opportunities are passing. These people seldom add anything to the activity in which they are engaged, but merely feed on the ideas and effort which have been contributed by others. We, as an industry, sat back smugly, knee deep in orders, and allowed thousands of others who knew nothing of our business to step in and meet the tremendous demand for our product that we were too lazy to supply.

In short, the growth of our industry was caused by a series of fortuitous circumstances; first, the invention of high production machinery; second, the demand for building created by the war; third, the unavailability of competitive materials.

Now we are here, with our market reducing, with many of the quick-money men already dropped by the wayside and most of us still thinking that the technical problem of manufacturing more units is the answer to our problem. The answer is not there. Anyone with dollars can buy a block machine and make as many units as the next person.

What are we doing to create our own business? What are we doing to demonstrate the superiority of our product over competitive products? By far the highest proportion of us are selling nameless products with no character whatever. We spend more time trying to take business from one another than we do in trying to create new needs, new uses, new markets.

We are serving a market which has come our way more through circumstance than through our own effort. We have grown bigger, more aggressive perhaps; we are eyeing the potentialities of the apparently tremendous market for floor-ceiling block; but, on the whole we are not bringing much more imagination to our merchandising than we did before the war.

There have been merchandising ideas promulgated, it is true. Model houses have been built by some, but for the most part they have been built for profit more than for the opportunity of showing what can be done with block. A high proportion of manufacturers make no pretense of advertising either their own product or block as such. They ride on the coattails of high demand and the efforts of others.

Try to find another product whose manufacturers have as little pride in their manufacture as do block manufacturers. You will find trade names and brand names on the glass in your windows, and the shingles on your roof. Your rugs, your door locks, and your toilet seats will have names on them or on the package in which they came. Lumber is branded, printed or otherwise packaged; bricks are made in interesting textures with attractive

*General Manager, The Geist Coal and Supply Co., Cleveland, Ohio

Cube of 4-in. block—trademark is clearly legible when block are delivered to job site

Exhibit at 1947 show with each section of wall finished differently both inside and out. Wall in left rear has ashlar cut block outside, cavity wall construction, plastered on the inside. Note use of half block, scored to look like brick, through doorway

names and marketed for these qualities under the name of the maker.

Of the billions of masonry units made and sold every year, hardly the tiniest percentage has any identifying mark that means anything to the purchaser. Hardly a larger percentage has any name that is of any value to a merchandiser. Some producers put mold marks on their block, perhaps demanded by the building inspector, and make themselves believe that these secret marks have advertising value. Some manufacturers make two-core block, others make three-core, some use a wide mortar bed, or a hand hold. There are dozens of ways to identify block to people who know block. To think such identification is of merchandising value is as foolish as thinking that all automobile manufacturers would make identical automobiles and expect them to be identified by the tread on the tires.

Concrete masonry units are known, generally speaking, merely as "concrete block" and their qualities of economy, insulation, ease of laying, beauty, are not impressed upon the buyer by the type of promotional activity generally engaged in. How can you sell effectively such a characterless thing as a "cement block."

We must inevitably come to the conclusion that, on the whole, the block industry is not promotional minded. Advertising and promotion are a state of mind and, individually and collectively, we must achieve that state of mind if we are to maintain the market for our product that we now enjoy.

Let me give an example of what I mean by "state of mind." Eight or nine years ago we devised a simple method for marking block quickly and practically without cost. Name, trademark or date could be applied easily for little more than the cost of the paint alone. Since that time we have had one of these devices in use on our block machines with very few days when it was not working. During all that time our trade name GEISTONE has been applied to our block. We have tried to make that name mean something to prospective block buyers, to builders, to architects. The only possible way the product can be tied to our promotional effort is actually to mark the product itself with the trademark. To expect architects, builders, or owners to specify our product we must give that product some identity.

We sold a few of these devices for the marking of block and subsequently heard more reasons why they would not work than you would believe possible. This was a simple device, consisting basically of a spray gun, mechanically contrived to mark block as they emerged from the block machine. All it needed was the thumb pressure of the offbearer. The same people who operate complicated block machines, air compressors, lift trucks, belt conveyors and elevators told us they could not make a spray gun operate!

There is only one reason why that stencil machine did not work. That is because the men in the front office of those block plants did not insist on the shop men making it work. They did not have the state of mind for advertising and promotion. To them it was unimportant whether their block were marked or not.

The Geist Co., as a block manufacturer, has had as many faults as any other manufacturer. We have spent money for pencils, and yard sticks and other give-away items that we charge to the advertising account. True, those things are advertising, but they add little to the sum of human knowledge and they do exactly nothing to make an architect think he should specify our block instead of face brick or lumber. They will create good will when they are used judiciously and they definitely have a place in the general picture. We kid ourselves if we think they are going to create a bigger block market for us, say five years hence.

For years our company had folders which told the story of our product. In those folders we tried to be constructive and we tried to create new markets. We never decried other building materials or our competitors' block. Furthermore, we made these folders as good and as effective as our own imagination, our own purse, our market, and the help of a top grade advertising agency could make them.

Advertising

For a block plant we do a reasonable amount of advertising. We use truck signs and job signs. We've had at least one new folder a year for a number of years. These folders tell the story of our product and we distribute about 40,000 each year. We have a somewhat more technical folder on cavity wall construction for the use of architects, engineers, or anyone who might be interested in that type of construction. These folders are our own ideas, our own creation, with pictures of our own jobs and words out of our own minds. These folders, including art work, printing and paper but, counting none of our own time which is plenty, cost us on the average about a nickel apiece.

We have signs on our buildings where we think they will do some good and our employees wear embroidered GEISTONE trademarks on their shirt pockets or on their caps. We *sell no concrete block*, we *sell only GEISTONE*. That name appears on invoices, on statements, in all our advertising and on our letterheads. All of us think GEISTONE, and talk GEISTONE, and believe firmly that GEISTONE is a particularly special kind

Facade of Geistone house, garden wall and terrace of block at 1946 Home and Flower Show. Haydite and cinder block were used for contrast

of building block, and try to make the world believe it.

We buy thousands of the folders of the National Concrete Masonry Association and the Portland Cement Association each year and find them of tremendous help in doing the specialized jobs they are designed for. We use the N.C.M.A. Pictorial and send the *Cinder News* to our complete list of architects and wholesalers.

In addition to this we knock ourselves out with our display at the Cleveland Home and Flower Show each year. This show comes in March, runs for eight days and attracts a large crowd for anyone with merchandise to show. Last year it drew upwards of 175,000 people who were interested enough in gardens and houses to pay 75 cents to see the exhibits. For the past several years we have built sample houses, or parts of houses, to demonstrate the use of block for interesting uses and attractive walls, both above ground and below. We distribute perhaps 20,000 pieces of various kinds of advertising at this show, which represents the number of people who are sufficiently interested in our exhibit to stop and talk with one of us. We generally keep five men manning the exhibit at all times to take care of interested people, and find that frequently these five must be given additional help. We build this model only for the show and tear it down afterward as junk. A fair estimate of the cost of this show to us this year is $10,000 and we feel that we got our money's worth.

We do this advertising, which is constructive, selling advertising, and feel that we need to do much more to come even close to maintaining the market we have enjoyed in the past few years. To increase our market will require more effort than we alone can give it.

Now, if all block makers everywhere would do creative, helpful selling, and advertising and promotional work, and would back up these efforts with honestly made products, proudly marked, then we could begin to believe that the block industry is headed for bigger things.

There is a basic problem. The few of us who believe in advertising and promotion must convince the many that serious, helpful advertising is necessary to our continued industry, health and growth. All the help that is available is useless unless the block manufacturers use it.

Those of us who believe in advertising must continue to believe in it. For guidance we have our own advertising department of the National Concrete Masonry Association which is new but bears promise of great things. Secondly, we have our strong ally, the Portland Cement Association, which spends much money each year in the promotion of our products. Third, we have the machinery manufacturers, the cement manufacturers, and other suppliers of machinery who stand ready and willing to help us create new and better markets for our industry.

Finally, we must convince every association member and every block manufacturer that proper promotion of our product, backed by quality manufacture, is the answer to our problem. We must discuss the problems of sales and promotion more fully and more frequently at all our meetings. We must have aggressive, imaginative advertising aimed not at each other but rather at our rivals in the building field. We must use all the help that the N.C.M.A. and the P.C.A. are able to give us. There are folders and publications for almost every purpose and those must be converted to our specific uses and distributed where they will do some good.

It is imperative that we develop and use all the ideas that we can, that we do more advertising and on a higher plane, and that we begin to think as big as our industry is if we expect to go on to better things, and maintain our present prosperity. The alternative is that we revert to our status as a backyard industry, which was the ugly duckling of the building business.

Bulk cement hauler indicating use of trademark—all equipment is used as a medium of advertising to promote Geistone. Note that trademark only, not company name, appears on trailer

Washington Masonry Producers Hold Meeting

CONCRETE PRODUCTS ASSOCIATION OF WASHINGTON held its 21st annual winter meeting in Seattle on December 10. The morning session was devoted to committee reports and general business. A resolution presented by B. E. Harrison, chairman of the standards committee on pipe, was accepted by the group. This reads as follows: "As a means of maintaining the quality of small sewer pipe the Concrete Products Association of Washington recommends that a daily fill test be made on small sewer pipe and a written report of the results be submitted to the main office." G. P. Duecy, chairman of the membership and contact committee, reported new members. F. M. Kettenring, chairman of the advertising and public relations committee, reported on the cost and make-up of advertising undertaken by the association. L. C. Gourlie, chairman of the safety committee, reported on accidents in plants and outlined increases in the industrial insurance and medical aid rates.

C. M. Howard of the association staff discussed problems arising from the use of the wrong specification pipe in both sewer and culvert and the difficulties developing from improper bedding and backfilling of all pipe lines. He called attention to the need for closer supervision in the placing of culvert and sewer lines and suggested that association members take a more active part in improving pipe placement in the field.

A sound film made by Mr. Lilligren and Mr. Rice of the Materials Handling Equipment Co., showing methods of mechanical handling, opened the afternoon session. A second film by Mr. Nelson of the Concrete Machine and Equipment Co., Portland, showed a new packerhead pipe machine and a concrete roof tile machine. C. M. Howard outlined the irrigation pipe tests made by the Bureau of Reclamation in conjunction with the California Associated Concrete Pipe Manufacturers. J. J. Wegner and W. E. Cox, division of industrial research, Washington State College, Pullman, made a progress report on the pumice research program underway at the college. E. E. Cummins reviewed the work done at the college in studies on the breakage and reduction of flow in concrete irrigation pipe as reported in Bulletin No. 204, recently released by the college.

R. J. Cotter of the association staff outlined several aspects of concrete masonry construction, details of which are being developed by the Standards Committee under the chairmanship of Verne Frese. A dinner at the New Washington Hotel honored W. A. Bugge, Washington director of highways, and members of his staff, including O. R. Dinsmore, assistant highway director, E. C. Simpson, construction engineer and G. H. Shearer, Seattle district engineer. Mr. Bugge spoke briefly on highway work in progress. One point of particular interest made was that jobs are being contracted for as soon as money becomes available from the Gas Tax Fund.

QUALITY, COSTS AND SELLING KEYNOTE ATLANTA MASONRY MEETING

TRADITIONAL southern hospitality filled the Biltmore Hotel in Atlanta, Ga., as the Southeastern regional meeting of the National Concrete Masonry Association took place November 20-22. The thoughtful hosts provided a varied program ranging from formal sessions, in which merchandising was stressed, to informal gatherings where group discussions and tours proved relaxing and helpful. The only militant note to enter was the warning that increased competition from active competitive groups warranted the firing of an advertising broadside by all concrete products men. The battle cry arising from the meeting was "Improve your product, and get out and sell it."

George Katterjohn, Katterjohn Concrete Products Co., past president and a director of the N.C.M.A., called the first formal session to order. Following his introductory remarks, in which he praised the activity of the Southeastern regional group, Mr. Katterjohn introduced N.C.M.A. president Harold Spaight of Cedar Rapids Block Co., Cedar Rapids, Iowa. Mr. Spaight remarked that the annual Southeastern meetings are among the largest and most important in the country, and deservedly so.

John S. Bailey, Concrete Manufacturing Co., Atlanta, welcomed the visitors to Atlanta on behalf of the Georgia convention hosts, who were J. G. Marbury, Albany Concrete Products Co., Albany; W. A. Mathis, Athens Concrete Products Co., Athens; H. E. Shaw, Atlanta Aggregates Co., Atlanta; L. K. Camp, Camp Concrete Products Co., Columbus; G. A. Austin, Consolidated Quarries Corp., Decatur; G. S. Clarke, Jr., Cement Products Co., Savannah; and Mr. Bailey. Mr. Bailey was very enthusiastic about the future for concrete building units, claiming that concrete is the only material that can be used successfully on a majority of the many building projects projected or under way. However, he warned that it behooves all concrete products men to increase their efforts to make the best block possible.

Mr. Shaw presided at an open discussion of business conditions in the Southeastern region, calling upon members on the floor to state their experiences. From this discussion it appears that the concrete masonry business is in a healthy state in general, and that prospects for a high volume of business in 1950 are very encouraging. The only divergent view was presented by a Texas producer who pointed out that, though business conditions in his area are excellent, the block business there is still in its infancy. Problems peculiar to his area, such as the financing of building units, upon which all future building is contingent, have become so serious that a new organization, the Texas Concrete Masonry Association, is being formed to aid in solving them.

Trends in Costs

Trends in costs and credits in the concrete masonry industry were discussed by R. E. Champion, Atlanta credit man. Costs have gone up only in fractions of a cent, and it is evident that both prices and costs have been stabilized to a considerable degree. The recent amendments to the Wage and Hour Act, providing for a minimum wage, may have some effect on costs, in Mr. Champion's opinion, for it is foreseeable that with unskilled labor receiving a minimum of 75c per hour, skilled labor may demand a proportionate wage increase.

Mr. Champion stressed the need for close control of credits, pointing out the problem arising if an unknown contractor, who might take his business elsewhere, is refused credit. When asked whether credit controls should be tightened or relaxed, he answered that that problem should be left in the hands of a good credit man. To the complaint that many companies were too small to afford this, Mr. Champion stated that it is oftentimes possible to obtain the assistance of a credit manager employed by a large company. The speaker added that credit risks should not involve a loss of over one percent and should be kept to ½ percent whenever possible. The Portland Cement Association's film "The Drama of Portland Cement" concluded the morning meeting.

Merchandising

At the first afternoon session M. E. Rinker, Rinker Material Corp., West Palm Beach, Fla., presided. This meeting was devoted to discussing merchandising programs and the efforts the N.C.M.A. is making in this direction. Mr. Rinker emphasized the industry's great need for marketing skill and for publicity to counteract public misinformation. He illustrated the latter point by telling of a friend who suffered ridicule from contractors, architects and neighbors because he wanted to build a concrete house.

John Ruhling, training director of the Portland Cement Association, unfolded a merchandising plan of great benefit to producers. This plan consists of selling ideas used and collected throughout the nation. The concrete masonry industry utilizes all selling techniques which are promoted by close liaison between the P.C.A. and N.C.M.A.

Mr. Ruhling claimed that the ability to merchandise is the basis of a stable economy. As a preliminary to his slide-illustrated talk, he mentioned three essential points for all to keep in mind: (1) make a quality block, (2) produce economically, and (3)

Sam Levine, Miami, center, and H. O. Pommer, Memphis, right, members, and Paul V. Lopez, association guest from Havana, Cuba, waiting in front of hotel to board bus for field trip

sell vigorously. Markets for masonry units fall into three broad classes: (1) housing (tremendous 1950 public construction program), (2) farm, and (3) industrial-commercial.

Mr. Ruhling reiterated the methods to follow in selling concrete masonry. First, he suggested that the producer contact those people who control purchases, then create interest and finally create a preference for concrete units. The people to see who influence purchases in the housing market are: prospective home owners, building officials, finance agents, trade and vocational schools (to create a preference, possibly by furnishing materials for building trades classes), architects and contractors. The industrial and commercial market is influenced by purchasing agents, industrialists, contractors, maintenance employes, public utilities, industrial engineers, railroad men, clergymen (big field in church construction), public officials, architects, and truckers. The advantages of great savings in the use of concrete masonry can be stressed in the industrial market. The farm market is influenced by cattle raisers, bankers, county agricultural agents (a very important man to contact), dairy plant operators, cheese factories, milk inspectors, and rural builders.

In the matter of advertising Mr. Ruhling had many suggestions to present. He first mentioned how the P.C.A. is helping the entire concrete industry by advertising the advantages of concrete in trade and consumer magazines having a total circulation of about 17,000,000. One of the first steps a producer can take on his own is to publicize his firm's name on silos, trucks, in the classified section of the phone book, and in newspaper ads. For the latter, according to Mr. Ruhling, it is helpful to discuss the ad with the local newspaper editor or staff.

P.C.A. furnishes prepared advertising mats free of charge. The association is preparing a "Concrete Masonry Merchandising Kit" to enable everyone to be his own ad writer. This kit will contain pictures, captions and text which can be selected by number and used to prepare a professional ad directed towards the producer's particular market. The kit won't be issued until the first of the year, and more information will be available at the Chicago convention in February. The P.C.A. spokesman pointed out the relative economy of newspaper ads. Average cost of a 6-in., one column insertion in a paper with 35,000 circulation is $14.79. Consider how much it would cost to make phone calls, or to visit, all those potential customers, Mr. Ruhling declared.

Many factors are involved in a merchandising program, continued Mr. Ruhling. It is very important to make a market analysis. What kinds of outlets are there in the area? What is the building record for the area? How far will it be necessary to extend the market area? These are some of the questions the producer should attempt to answer.

Left to right at dinner-dance table: Mr. and Mrs. Doug Williams, Kotterjohn Concrete Products; Mrs. R. C. Page; Nelson Severinghaus, Consolidated quarries; and C. F. Needham, Aquatite Tile Co.

The speaker mentioned other means of placing the name of the company and its product before the public. Hold open house, show visitors the plant and discuss manufacturing problems with them. Teach your truck drivers to be salesmen. Call on bankers to acquaint them with your product. The county agriculture agent might appreciate an occasional gift. Organize a direct mail campaign, keeping these points in mind: make regular mailings, follow up with personal letters, address specific literature to individuals, use peppy letters and use selected lists.

Other promotion aids include a radio ad campaign (very helpful in reaching farmers), use of small model homes to demonstrate concrete masonry construction, job signs, window displays in local buildings, and displays at home shows. The producer should have presentable offices, preferably with walls or displays showing finished block sections. A display rack for publications is convenient to make literature accessible to customers.

Mr. and Mrs. C. B. King, seated, and F. Paul Anderson, all of Maule Industries, Miami, Fla.

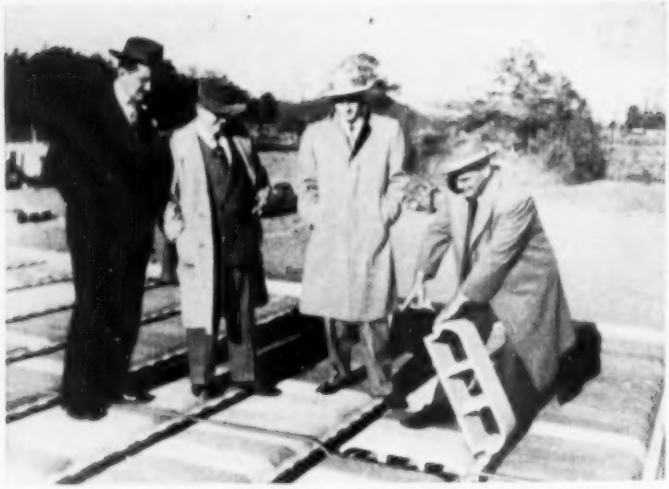
How big should an advertising program be? Mr. Ruhling said the answer to that will depend on individual factors, but that all undertaking such a program can ask themselves these questions: What is the state of business in my area? How much do I have to spend for advertising? What is the nature of my competition? How can I merchandise my product most effectively?

Promotional Pieces

William Markert, director of promotion and publicity for N.C.M.A., disclosed the association's promotional accomplishments during the past few months. The monthly "Reporter" was begun in May. The booklet "Concrete Masonry in Churches" was issued and steps have been taken to issue similar booklets on schools and hospitals in the near future. A descriptive section was prepared for insertion in Sweet's catalog, Mr. Markert said. Large scale pictures showing concrete masonry construction are now available for display at local trade shows, he added.

Ben Wallis, Florida Portland Cement Co., Tampa, chose for his topic "There Must be a Market for Concrete Before There Can be a Market for *Your* Concrete." He told of the series of ads his company is using to encourage the building of concrete homes. He concluded by urging the members to work harder to fight competition of other building materials.

The first day's session concluded with an open forum in which a group of "experts" answered questions. Lewis Lloyd, Alatex Concrete Products Co., New Orleans, La., was moderator. One question asked was whether there is reluctance by some F.H.A. officials to approve concrete masonry construction. One answer was that there is more reluctance on the part of financiers. In New Orleans, the F.H.A. required furring on the inside wall and stucco on the outside. It was pointed out that some



Delegates view actual demonstration of laying a unit-type floor system

officials would like more assurances that walls will not develop cracks.

Reinforcing Masonry Units

The concluding session on Tuesday was opened by Carroll Strohm, Nashville Breeko Block Co. and treasurer, N.C.M.A. Paul Anderson, Maule Industries, Miami, Fla., discussed "Strengthening Block Structures Through Special Block and Reinforcing." Strict building codes and frequent heavy winds up to 150 m.p.h. have necessitated extraordinary provisions for strong construction in Miami, Mr. Anderson said. His company, he continued, has developed a masonry column block which speeds up construction and gives a very strong corner. Masons lay the hollow corner block and pour concrete in the center. Two types of block are made, one for residential construction and one for commercial use having a larger core. Mr. Anderson also said his company was planning to import pumice from Greece for sale to East Coast producers. The cost is favorable, for many ships otherwise returning empty from Greece can carry the pumice as ballast.

Precast Units

R. E. Copeland, N.C.M.A. director of engineering, spoke on "Precast Floor Filler Block Systems." The picture is changing rapidly from a few years ago, he said, when very few floor systems were in use. There now is a potential market for 500,000,000 units a year for floors, he claimed, and a 50 percent increase over present production can be achieved in 10-15 years. The purpose of his talk was to give a picture of development progress in precast systems, a timely subject, for a large potential market and high plant investment make it necessary to keep plants busy.

Mr. Copeland said the basis for selection of the six systems he discussed was that all employ concrete masonry units made on a standard high production block machine, all are being developed actively, and all are properly designed within these limits. The systems discussed were standard filler block, Soffit, Stresterete, Dox, Joistile and F & A. All these systems have advantages dependent on local conditions. For the block producer to choose a system, he should consider the market available, the amount to be invested, promotion of the product and necessary engineering service needed. Mr. Copeland said that not all producers should go into precast floor systems, for certain markets will not warrant the investment.

Mr. Dienhart gave a report as executive secretary of the N.C.M.A. He stressed the importance of making sound concrete units and of providing follow-up service to make sure the contractor makes full use of the advantages of concrete. Mr. Dienhart closed by saying that the national organization would do all it could to promote concrete masonry, but that individual producers should do their utmost to improve their products.

An invitation from the Mayor of Tampa, delivered by Ben Wallis, to hold the 1950 convention in that city was speedily accepted by the group.

The Atlanta hosts proved their hospitality by inviting all members to a cocktail party and a dinner-dance. A tour by chartered bus was also provided to three local plants, Atlanta Aggregate Co. block plant (equipped with a Besser Super Vibrapac), Concrete Manufacturing Co. (Stearns "15" and Warren "800") and the Sargent Concrete Pipe Co. at Decatur, where a new plant is under construction.

Concrete Homes for Egypt

Karl P. Billner, president of the Billner Vacuum Concrete, S. A., Philadelphia, Penn., announced recently that his firm will supervise the construction in Cairo, Egypt, of the first multi-story apartment house structures ever to be built entirely of prefabricated concrete. The project calls for construction of 600 modern two-to-three bedroom apartments housed in four-story units at a total cost of $2,000,000, or an average of $3300 per apartment. Work on the project is just getting under way.

Wisconsin Masonry Group to Meet

Wisconsin Concrete Products Association will hold its 30th annual convention at the Plankinton Hotel in Milwaukee on January 19-20. Merchandising will be the principal topic for discussion. The morning of Jan. 20 will be devoted to a round table discussion on selling problems.

H. A. Shaw, Atlanta Aggregates Co., pointing to window in company's curing room for benefit of George Katterjohn and other members who were on association field trip

N.C.M.A.'s Chicago Convention

THE NATIONAL CONCRETE MASONRY ASSOCIATION will hold its annual meeting February 6-9 at the Sherman Hotel, Chicago, Ill. Reports of the president, treasurer, executive secretaries and director of engineering will be given at the opening session after which Elmer Astleford will talk on "How to Take Usable Photographs of Concrete Masonry Structures." Other reports to be given will include those of the Noble award committee, managing committee, and the group and life insurance plan committee. John L. Strandberg will present a short discussion of observations made on his recent trip to Europe.

Pre-fabricated Construction

On the morning of the second day, discussion of pre-fabricated floor and roof construction employing machine-made concrete masonry units will be featured. Wayne Hart, Cleveland Builders Supply Co., will present a review of the Dox system and Roy Darden will cover the F & A floor system. L. Coff, consulting engineer, New York City, will talk on "Developments on Prestressed Precast Structural Concrete," and H. Banker, Portland Cement Association, will review "Use of Concrete Masonry Units in New Portland Cement Association Research Laboratory."

In the afternoon the following topics and speakers will be heard: "Joistile System" by Lawrence Condrey, Precast Concrete Products, Inc.; "Strestcrete System" by Harold A. Price, Basalt Rock Co.; "Opportunities in the Field for Machine Grinding of Concrete Masonry Units" by three outstanding producers who have had experience along this line; and "Our Approach to Automatic Production of a Streamlined Plant Operation" by C. G. Snyder.

One full day will be devoted to inspection of plants in the Chicago area, and on the same evening meetings will be held for producers of various aggregates including Celocrete, Enslite, haydite, pumice, Superock and Waylite.

Merchandising

A meeting on merchandising will be held on the last day starting with the motion picture, "Drama of Portland Cement." Carl A. Muenzel, Portland Cement Association, will discuss "Merchandising and Marketing Aids for the Concrete Masonry Unit Industry." Other topics to be considered will include: "How Cost Accounting Shows the True Value of Building Material" by Marshall E. Erickson, masonry contractor, Kansas City, Mo.; "Some Assurances for an Adequate Supply of Bricklayers to Meet the Requirements of an Expanded Market for Masonry Construction," by John J. Murphy, secretary, Bricklayers, Masons and Plasterers International Union of America; and "Program of the Housing and Home Finance Agency," by Raymond M. Foley, director.

An inspection tour of the new P.C.A. research laboratory at Skokie, Ill., will be the last event on the program.

Precast Concrete Slabs for Bridge Repair

CONCRETE PRODUCTS CO., OF AMERICA, Philadelphia, Penn., and UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, are producing precast concrete slabs designed for rapid replacement of worn out bridge decks. Slabs are made to specification for approaches and span lengths up to 40 ft. They are 3 ft. wide. By using the precast slabs, Pennsylvania reports that it has been able to rebuild a 16-ft. long bridge with a roadway 24 ft. wide for $1705, a saving of over 25 percent compared with conventional methods. Five unskilled workers were said to install the precast slabs for such a job in 25 man-hours.

The slabs, reinforced with steel, are cast in molds at the two firms' factories. Concrete Products Co. uses a vacuum system to suck out excess water. The company holds exclusive licensee rights owned by Vacuum Concrete, Inc., Philadelphia, Penn. Following a three week curing period, the slabs are trucked to the repair job, at which time the old bridge is ripped out.

The slabs are said to have a number of advantages. They are salvageable and can be used for temporary crossings, then be dismantled and reused. Use of the slabs permits year 'round construction; there is no halt for the right temperature to occur. A big advantage is that slabs can be installed at night, when traffic generally is lighter. A big potential market, according to Sam Buderman, Universal's sales engineer, is rental of slabs for temporary bridges while primary crossings are being repaired. A market is also developing for road approaches and foot bridges on farm lands, he added.

Universal Concrete Pipe Co. makes slabs 40 ft. long and eventually hopes to produce units up to 70 ft. in length, using a new design and running high-strength steel through the concrete. At present, Concrete Products Co. has set 36 ft. as the maximum length for its slabs. Slabs weigh from 3-6 tons each, and the heavy equipment required to handle this load has been a bar to widespread adoption of the method, company spokesmen have reported. Pennsylvania, West Virginia and Florida are three states which have given their approval to the slabs for bridge repair.

A.S.T.M. Committee on Concrete Pipe Holds

THE FIRST MEETING since 1940 of Committee C 13 on Concrete Pipe of the American Society for Testing Materials was held in St. Louis, Mo., on November 17. Sub-committees were delegated to prepare reports for the next meeting to be held this Spring. Subjects to be studied and the sub-committee members appointed are:

Sub-committee on clarification and revision of the three-edge bearing test: R. R. Litehiser, chairman, M. W. Loving and J. A. Dunn.

Sub-committee on extra strength or triple strength non-reinforced concrete pipe in sizes 12 in. through 24 in.: E. F. Bespalow, chairman, and H. W. Heath.

Sub-committee on revision of reinforcing to conform to the Simplified Practice Standards and providing provisions for adequate welding: F. B. Brown, chairman, and W. L. McDaniel.

Sub-committee on review and revision of absorption test: E. F. Kelley, chairman, R. R. Litehiser, and A. V. Bratt.

Sub-committee on revision of the provision for types of cement: Howard F. Peckworth, chairman.

Sub-coordinating committee for the above temporary matters: Samuel A. Greeley, chairman, and Howard F. Peckworth, secretary.

Steering committee to formulate a long range program: E. F. Kelley, chairman, W. E. Corbett, S. A. Greeley, Max Nearing and H. F. Peckworth, secretary.

At the 1940 meeting specifications C 14 (Concrete Sewer Pipe), C 75 (Reinforced Concrete Sewer Pipe) and C 76 (Reinforced Concrete Culvert Pipe) were revised and presented as tentative standards. These specifications were advanced to the status of standards in 1941, and together with specification C 118 (Concrete Irrigation Pipe) constitute all the specifications coming under the jurisdiction of Committee C 13.

Officers of Committee C 13 are: W. W. Horner, consulting engineer, St. Louis, Mo., chairman; E. F. Kelley, chief, Division of Physical Research of Public Roads Administration, vice-chairman; and H. F. Peckworth, managing director, American Concrete Pipe Association, secretary.

NORTH CAROLINA CONCRETE MASONRY ASSOCIATION held its fall meeting November 16 in Salisbury. Lightweight aggregates were discussed. Johnson Concrete Co., Salisbury, was host to the group, and J. F. Cannady, Henderson, president of the association, presided.

AMERICAN CONCRETE BLOCK CO., Shreveport, La., constructed a complete section of a house for its exhibit at the 1949 Louisiana State Fair. The wall construction was of cinder block and the roof of conventional frame composition shingle construction. The ceiling was made of sheetrock.

Air-Entraining Agents

(Continued from page 214)

results, control air at optimum 4½ percent; no load to leave plant with less than 4 percent air. Use electric timer and recordograph to guarantee that standard mixing time schedule is rigidly followed.

b. Preshrinking in central mixing — mixing completed in agitator— standardize on set time in central mixer. Hold the driver to additional regulated mixing time in agitator to get optimum air content.

4. Determine amount of agent required for each standard mix.
5. If aggregates remain fairly consistent, air content will remain constant unless considerable change in weather occurs. As weather becomes warmer, an additional amount of agent generally will be required to maintain the optimum air content.
6. Regularly made slump and air tests.
7. Accelerating, dispersing and retarding materials—we use such materials. When using them, add air-entraining agent separately. All evidence to my knowledge indicates the same lack of control over air content (when air-entraining agent is included in a solution—or other combinations — of such materials), as when air-entraining cement is used.

It must be apparent to all by now that the amount of air entrained in a concrete mix may be most readily controlled by changing the percentage of air-entraining agent. The ability to control the amount of entrained air by the percentage of air-entraining agent is fundamental to the processing of uniform, consistent quality, air-entrained concrete. Constant air content for any set of conditions can only be maintained by adjusting the quantity of air-entraining agent added to the batch.

Don't abuse air—use it properly!

Accurate Batching

(Continued from page 203)

tercommunication is provided between the batching plants, maintenance shops and all offices.

Roy N. McCandless, formerly of Cinder Block, Inc., Detroit, Mich., and past-president of N.C.M.A. is president of Turner Gravel Co. and its ready-mixed concrete adjunct. Other officers are Mrs. McCandless, vice-president; L. Maurice McCandless, secretary and treasurer; Alfred B. Lanford, general manager; and O. A. Coward, assistant general manager.

*Another Leader** IN THE CONCRETE PRODUCTS INDUSTRY PREFERS BESSER VIBRAPACS!

New office of Cedar Rapids Block Co., now under construction. Vibrapac Soffit Block are being used for the roof. Acrow Telescopic Centers supplied by Besser.

Window opening in new office building. Note application of Dur-O-Wal reinforcing.

Workman laying Vibrapac Soffit Block on Acrow Floor Centers.

Harold L. Spaight, President of NCMA Operates a Two Vibrapac Plant

Twenty years ago, the production of block at the Cedar Rapids Block Company plant was only 1000 units per week. Today, operating two Vibrapacs, their production is approximately 60,000 units per week.

An important factor in the development of concrete masonry, Mr. Spaight is currently President of N.C.M.A. and one of the principal producers of concrete masonry units in the middle west. In addition to producing sand and gravel block, Waylite units, floor and roof slabs and precast joists, Mr. Spaight is the inventor and manufacturer of Dur-O-Wal, a unique type of trussed steel reinforcing for concrete masonry walls.

BESSER MANUFACTURING COMPANY

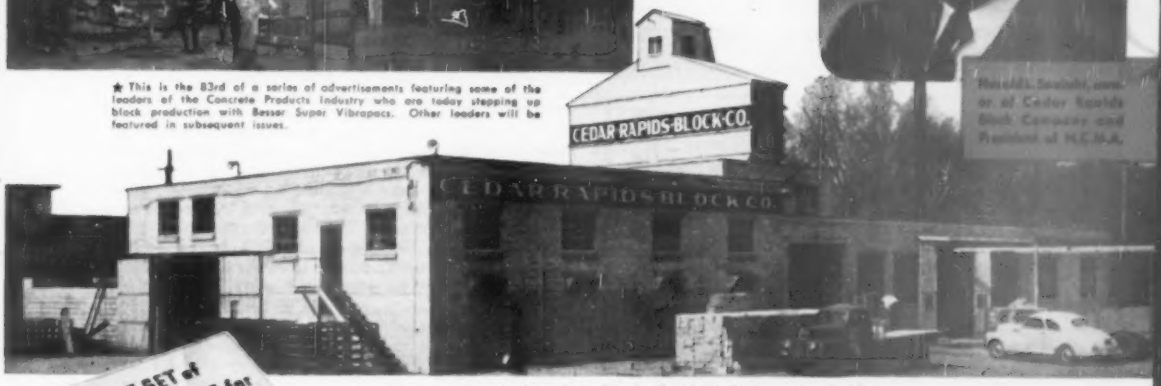
Complete Equipment for Concrete Products Plants

115-30TH STREET • ALPENA, MICH., U.S.A.

Interior view of Cedar Rapids Block plant showing two Besser Vibrapacs in operation. Each machine produces three 7⅝" x 7⅝" x 15⅝" units at a time on one Plain Pallet.

Harold L. Spaight, owner of Cedar Rapids Block Company and President of N.C.M.A.

★ This is the 83rd of a series of advertisements featuring some of the leaders of the Concrete Products Industry who are today stepping up block production with Besser Super Vibrapacs. Other leaders will be featured in subsequent issues.



ONE SET of PLAIN PALLETS for ALL SIZES of UNITS

Modern plant of Cedar Rapids Block Co. equipped with every facility for the production of high grade masonry units.

BESSER

SUPER VIBRAPACS · BATCH MIXERS · SKIP LOADERS · BLOCK CUBERS · AGLITE PLANTS · ACROW CENTERS · GENUINE PARTS

Masonry in Phoenix

(Continued from page 207)

sure boilers. Yarding is handled by Parker Elwell low-lift trucks, and stockpiling and loading of cured units, in cubes, is by Clark fork trucks. Policy is to carry a minimum inventory of two and one-half million units in in storage and the separated piles of block are dated to guarantee minimum age of 28 days. Robert Mizer is general superintendent of plant operations and Gene Crile, laboratory engineer, is in charge of sampling and testing.

Plant operating efficiency has been given much study in recent years, particularly to conserve labor. Shown here are two methods devised to eliminate manual handling in returning pallets to the magazine at the rear of the block machines. In the case of one machine, a roller conveyor carries the pallets in a circular path around to the back of the machine. The more recent method and which is much more effective, also shown, employs an electro-magnet which is controlled by the off-bearer. In placing a loaded pallet on a rack, the off-bearer, with magnet on its underside, picks up an empty pallet from the next lower deck in the rack. When inserting the off-bearer under the next loaded pallet at the machine, a dog trips the power supply to the electro-magnet and the empty pallet drops on to the machine feeder which carries the pallet into the magazine. This automatic pallet return was made in the company shop.

Another development of interest is the use of a self-unloading truck for delivery of units to the job. The truck is a White chassis with a trailer that will carry 1400 of the standard units. It has a retractable ramp and the bed and ramp are of rollers. To dump, the trailer is elevated into tilt position and the entire load slides down the ramp as the truck pulls forward. If properly handled, a full load can be set down on the ground in a neat pile with negligible breakage. Total time required is ten minutes.

Future Expansion

Builders Supply Corp. has built its operations to the point where capital investment is in excess of $500,000, and is proud that mechanical developments for improved efficiency have enabled holding the price line. In five years' time, there has been only one price increase charged to the customers and that was five percent.

Future expansion plans provide for installation of another block machine that will manufacture six standard units per cycle or double the production of each machine now in operation. The company contemplates the manufacture of pumice concrete masonry units near its pumice operations at Calipatria, Calif., where it has a 640-acre deposit and a crushing and screening plant with production

of 20 carloads of graded pumice per day. A 14-acre tract has been purchased for establishment of a block plant that, it is claimed, will be as fully automatic as present knowledge of plant operations will permit. Offices have been opened in Los Angeles, and California activities will be conducted under the firm name of Superlite Corp.

A.C.I. Convention Program

TENTATIVE PROGRAM for the 46th Annual Convention of the American Concrete Institute, to be held at the Edgewater Beach Hotel, Chicago, Ill., February 20-22, has been announced by the Institute's Technical Activities Committee. There will be seven sessions in five periods, with two of the periods being held concurrently. The program will include sessions on inspection, A.C.I. Building Code studies, reinforced concrete design problems, structural design of concrete pavements, admixtures for concrete, a panel discussion of questions on concrete problems and the annual open session on concrete and cement research.

J. W. Kelly, University of California, Berkeley, chairman of A.C.I. Committee 611, Inspection of Concrete, will be chairman of the session on inspection which will include the following: "Inspection and Testing of Materials," "Inspection of Building Construction," "Inspection and Control of Concrete for Highway and Bridge Construction," "Inspection of Mass and Related Concrete Construction," "The Contractor's Viewpoint of Inspection," "Inspection of Ready-Mixed Concrete" and "A Summary of Inspection Practices."

There will be a session devoted to A.C.I. Building Code studies and to problems common to A.C.I. Committees 208, Bond Stress; 318, Standard Building Code; 323, Pre-stressed Reinforced Concrete; 324, Precast Reinforced Concrete Structures; and 711, Precast Floor Systems for Houses. Papers to be presented pertaining to the A.C.I. Code are: "Deformed Bars and Allowable Stresses," "Footing Design" and "Recommended Design Specifications for Two-Way Floor Slabs."

Problems common to the several committees include: "Placing of Moment Bars in Precast Joists," "Extent and Acceptability of Cracking in Thin-Cover Precast Concrete Framing Members," "The Patent Status of Prestressed Concrete" and "Corrosion of Reinforcement in Thin-Cover Precast Concrete Framing Members."

"Long-Span Construction," "Prestressed Reinforced Concrete," "A Simple Mathematical Tool for the Solution of Difficult Design Problems," "Precast Concrete Construction in Europe" and "Precast Reinforced Concrete Structures" will be featured in

(Continued on page 226)

the session devoted to reinforced concrete design problems.

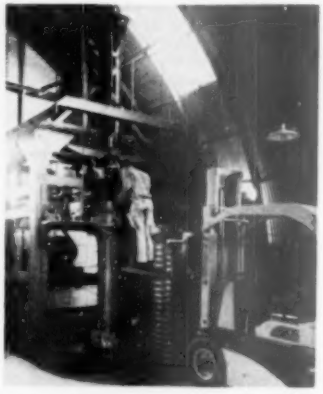
A session on structural design of concrete pavements is being developed by L. W. Teller, Bureau of Public Roads, Washington, D. C., chairman of A.C.I. Committee 325, Structural Design of Concrete Pavements for Highways and Airports. The papers include: "General Problems of Structural Design of Concrete Pavements," "Subgrades and Bases," "Slab Dimensions," "Structural Design of Joints" and "Steel Reinforcement."

W. T. Moran, U. S. Bureau of Reclamation, Denver, Colo., chairman of the session on admixtures, has included the following in the program: "Uses of Admixtures to Increase Resistance to Freezing and Thawing," "Admixtures in Underwater Construction," "Admixtures in Correcting Grading Deficiencies" and "Admixtures to Overcome False Set."

The annual open session of Committee 115, Research, under the leadership of S. J. Chamberlin, Iowa State College, Ames, Iowa, and George W. Washa, University of Wisconsin, Madison, Wis., will feature reports on the progress in cement and concrete research studies throughout the country. C. H. Scholer, Kansas State College, Manhattan, Kan., has been selected to preside at the panel discussion of questions on concrete problems which have been submitted by A.C.I. members. Presiding officer at the convention will be Herbert J. Gilkey.

Six-ft. Packer-Head Pipe

CONCRETE PIPE MACHINERY CO., Sioux City, Iowa, has just completed experimental tests on a new model "TT" McCracken packer-roller-head process concrete pipe machine. The new machine and the tests, according to R. M. LaDue, executive vice-president and general manager, were undertaken in response to the growing demand for longer lengths of concrete pipe by sanitary engineers. These longer pipe are made with the accuracy needed to enable the use of Tylox Rubber Gasket Joints, which also are demanded by customers, who must prevent infiltration in order to keep disposal plants from being doubled in size and cost.



New model concrete pipe machine which incorporates patented packer-roller-head process, and makes pipe in 6-ft. lengths from 12- to 36-in. I.D.

The tests conducted have proved that bell and spigot, and tongue and groove pipe can be produced in 6-ft. lengths and from 12- to 36-in. I.D. These tests covered concrete pipe made with both crushed stone and gravel aggregate, both reinforced and plain, and proved that all sizes and types could be stripped immediately, exposing an accurately made end product.

Cam-Operated Block Machine

PRASCHAK MACHINE CO., Marshfield, Wis., recently introduced its model "Automatic 400," an automatic block machine. The manufacturer states that this machine is operated by large, slow-moving cams, and has been designed to eliminate small, fast-moving parts. The unit employs both tamping and vibration, and in conjunction with a strike-off roller system, is said to assure the operator of producing modular products. Capacity of this machine is 400 modular 8-in. units per hr.

Expansion Sale Used Equipment

We must make room for new equipment. Every machine must be sold within the next 30 days.

4—Stearns Clipper Stripper Block Machines complete with motor and mold boxes.	$ 450.00 to 850.00
1—Multiplex Chimney Block Machine and 50 pallets.	165.00
1—Appley Twin Block Machine.	100.00
1—Complete Toth Block Plant—Block Machine, 12 cu. ft. Mixer, Skip Loader.	1250.00
1—Clark Fork Lift Truck—3500 lb. capacity, rubber tires.	1250.00
3—Small Hand Lift Trucks, Each	75.00
1—Butler Bin Weigh Batcher	600.00
2—Stearns 18 cu. ft. Skip Loaders, Each	500.00
2—Stearns 18 cu. ft. Concrete Mixers, Each	500.00
6000—12" Pressed Steel Pallets—like new, Each	.60
5000—6" Pressed Steel Pallets—like new, Each	.35
4000—4" Pressed Steel Pallets—like new, Each	.25

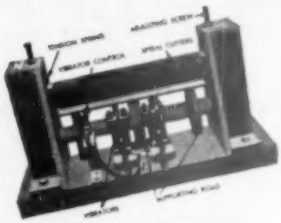
We have plenty of pallets in all sizes. Send us tracings of your requirements.

GENERAL ENGINES CO.

307 HUNTER STREET GLOUCESTER, N. J.

WRITE, WIRE OR PHONE: Gloucester 6-2899

Beals PALLET CLEANER



- Cleans pallets automatically
- Insures more perfect blocks
- Saves time, labor and expense
- Earns extra profits for you
- Makes better-satisfied customers

Requires no motor or additional power . . . vibrators operate from air compressor on your present cement block machine.

If you are troubled with dirty pallets consult the Springfield Pallet Cleaner & Manufacturing Co., and let them explain the BEALS Pallet Cleaner to you.

The BEALS Pallet Cleaner is shipped assembled, complete with instructions for installation. Can be installed by your own crew in about eight hours. Complete machine weighs approximately 900 pounds.

SPRINGFIELD PALLET CLEANER AND MANUFACTURING COMPANY

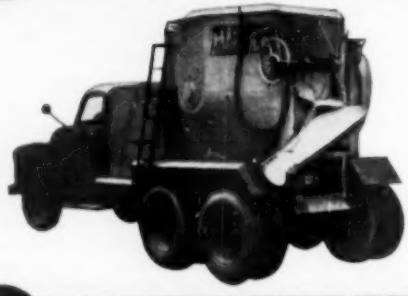
501 Southwood Drive, Springfield, Ohio

Hi-Lo-

CONCRETE TRANSPORT MIXER CO.

TRUCK MIXER

Hi- DISCHARGE PRODUCTION SPEED PROFITS!



Lo- HEIGHT COST MAINTENANCE TIME LOSS

REVOLUTIONARY TRUCK MIXER DESIGN

CONCRETE TRANSPORT MIXER CO.

4987 FYLER AVE. ST. LOUIS 9, MO.

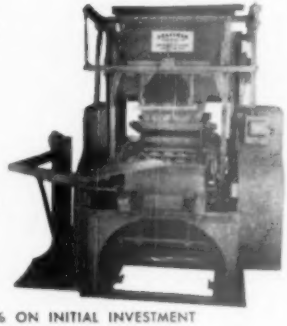
PRASCHAK "AUTOMATIC 400"

POWERFUL TAMP-PAC-HEAD

CENTERED VIBRATION

NO SMALL WEARING PARTS

400 BLOCKS PER HOUR



SAVE 50% ON INITIAL INVESTMENT

MIXERS, SILO STAVE MACHINES, LIFT TRUCKS, CONVEYORS, CINDER CRUSHERS, CUP ELEVATORS, ROTARY SCREENS.

WRITE FOR LITERATURE AND PRICES

PRASCHAK MACHINE CO.

MARSHFIELD WISCONSIN

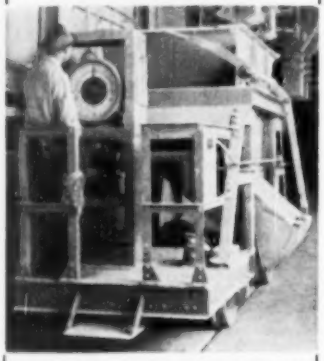
CLASSIFIED ADVERTISING

READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT

Single insertion rate $10.00 a column inch. Larger insertions at lower rates; request Concrete Products Classified rate card. POSITIONS WANTED and POSITIONS VACANT (not display ads) $1.00 a column inch an insertion. Terms: Cash with order except contract advertisers who are billed monthly.

FOR SALE

100 CU. FT. ELECTRIC SIDE-DUMP SCALE CAR



Car installed in Wisconsin plant 1948 Used very little. Is in A1 condition. Fully equipped electrically. Priced for quick sale.

F. S. ROYSTER GUANO COMPANY
Norfolk, Virginia

FOR SALE

1—No. 9 JOLTCRETE—2 years old. In good condition. With mold boxes to manufacture 4, 6, and 8 inch blocks.
Approx. 3400—4x8x16 Steel pallets
" 3600—6x8x16 Steel pallets
" 4400—8x8x16 Steel pallets
1—Air Hoist—53 Steel Racks, 72 Blocks capacity
1—Turn Table.
Will sell the above separately or together.

Box I-19, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Illinois.

PALLET CRUSTS REMOVED QUICKLY

Bergen's Pallet Cleaning Machine cleans an 18½x26" plain pallet in 12 seconds. For sale or rent.

Write for Free Literature

BERGEN MACHINE & TOOL CO., INC.
189 Franklin Ave. Nutley 10, N. J.

UNBREAKABLE PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

WHY NOT INSTALL an ASBESTOS-CEMENT PIPE or SHEET-MAKING PLANT? Complete plants for making PRESSURE-PIPES and CORRUGATED SHEETS. Short deliveries. Plants designed, equipped and started. Our Engineers have thirty years' experience in making Pipes and Asbestos-Cement Sheets.

DURITE TECNICA
Via Cavana 24 Trieste (Italy) Cable Address: Durite, Trieste

SPACE HEATERS

War Surplus Bargain

New—Ready To Use!

40,000 BTU capacity

—Burning gasoline, kerosene or diesel fuel.
—Electric blower—12 V. DC or 110 V. AC using small transformer.

Portable, Quick, Clean Heat

Ideal for curing room, concrete plants, work under construction, emergency heat, or auxiliary heaters.

$95.00 each

Clapp, Riley and Hall Co.
14 No. Clinton St.,
Chicago 7, Illinois

FOR SALE

1—Stearns Clipper Block Machine (Good condition)
1—8x8x16 Mould Box, Smooth and Rock face attachment
1—4x8x16 Box, 2 at a time
2300—8x8x16 steel pallets
1300—4x8x16 steel pallets

Dumhorst Bros., Concrete Block Mfrs.
1400 Spruce St. Quincy, Ill.

FOR SALE

28—48 capacity steel block racks at $15.00 each.
1—Lewis-Sheppard hand lift truck hydraulic $195.00. Box I-16, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Ill.

ANTHRACITE CINDERS

A car load or a train load. Our supply is unlimited. Processed ready to use. Locations on Baltimore & Ohio, Pennsylvania, and Lehigh Valley Railroads. Call or write

ROY P. McMINDES COMPANY
105 Mace Avenue Baltimore 21, Md.
Phone: Essex 179

FOR SALE

50—Steel hinged block racks with 4 decks, 48 block capacity in good shape—$15.00 each and guaranteed.

WM. M. CHASE (Dealer)
15 Linwood Ave. Buffalo 2, N. Y.

FOR SALE

Besser Super K-3 Tamper, fully automatic—6½ molds per minute. Completely overhauled recently with 3¾, 5¾, 7¾, 9¾ and 11¾ attachments. Also attachments for 9¾ and 11¾ return corners and Manhole Block. With 3600 ¼x12¼x18½ plain pallets, front end conveyor and air off-bearing hoist. Machine also equipped with vibrator. Machine in A-1 shape. Mixer and racks for this machine also available.

WEST BEND CONCRETE PRODUCTS CO.
West Bend, Wis. Phone 464-W

Fleming 10 cu. ft. mixer with motor; 8-inch, 20 ft. material elevator; Kirkham FMC 100 block machine with 2 8-inch modular mold boxes. All equip. in good usable condition. May be seen running until Dec. 31, 1949. All for $1500.00 F.O.B.

CITY CONCRETE BLOCK CO.
405 S. Second St., Leavenworth, Kan.

7—Mack Trucks, Model A-K, 4 cyl.; yr. 1928-31; $350.00 Each. Good running condition and good tires. Trucks were hauling 4 yds. concrete in agitators until August 1, '49.
1—Bucket, 2 cu. yd. Williams Material Handling Bucket; 6 months actual use—$1,800.00.
Subject to Inspection.
Above all F.O.B. Indianapolis

READY MIXED CONCRETE CORPORATION
1100 Burdsal Parkway Blvd.
Indianapolis 23, Ind.

FOR SALE OR TRADE: CINDER CRUSHER—double roll bonded. New 1940—25" four groove flywheel. Capacity 10 to 25 T.P.H. Used very little. Also Kirkham block machine. Will trade—what have you?
WANTED: Used high lift fork suitable for loading concrete pipe. Also Multiplex chimney block machine. Give complete description, lowest price.

WHEELER TILE CO.
Mayfield, Ky.

FOR SALE

Septic tank forms for manufacturing concrete septic tanks. Available in four sizes. For further information as to price and sizes, write to

YORK CONCRETE SEPTIC TANK FORMS
R.D. No. 1 York, Pennsylvania

FOR SALE

Crushed and sized cinder aggregate, tested and approved for the manufacture of cinder blocks. Write:

DULUTH CINDER SLAG & STONE CO.
Box 116 Duluth 7, Minn.

FOR SALE

PACKER-HEAD WINGS

McCracken Type — PROVED to last as long or longer — yet cost considerably less. Write for prices.

TEXAS FOUNDRIES
LUFKIN, TEXAS

OILED PALLETS ACT BETTER!

Sensational new Oiler rolls a perfect film of oil on 18½x20" pallets. Simple and inexpensive. No spray nozzles.

Write for Free Literature

BERGEN MACHINE & TOOL CO., INC.
189 Franklin Ave. Nutley 10, N. J.

FOR SALE

Lith-I-Block Machine 2100 Steel plain pallets, complete with compressor, steel racks, 8", 4", 12". Lintel and Chimney Mold Boxes. Capacity 3600 to 4000 units per shift. Price $9,000.00.

PUMICE PRODUCTS COMPANY
Boise, Idaho

27 cu. ft. paddle type batch mixer, $600.00.
2—3 HP 3600 RPM motors with Magnetic Brakes used 2 hours, $200.00.
1—Trockman Platform Lift Truck with spare motor, $450.
2—No. 200 Sputrens, $300.00.
1—½ HP Gearhead Motor, $50.00.

FRICKE BLOCK CO.
Cleveland Ave.: Ph: 8886
Manitowoc, Wis.

FREE

GRAVELEY (2-block-at-a-time) Vibrating Block Machine with Motor, Off-Bearer and Attachments Free if you buy the pallets at $0.20 each.

WM. M. CHASE (Dealer)
15 Linwood Ave. Buffalo 2, N. Y.

BUSINESS OPPORTUNITIES

READY-MIX PLANT

A very lucrative Inland Empire operation, grossing well over $200,000.00 1949. Sale price includes 4 transit mixers, new D4 Cat, several dump trucks, batch plant, unlimited supply of top grade sand and gravel. New office building. Plant enclosed for cold weather operation.

JAMES Y. COLVIN
503½ Riverside Spokane, Wash.

BLOCK PLANT FOR SALE

Or Manager wanted with $12,500 or more to invest in plant Profitably Operated 3 yrs., making Celocrete and Cinder Blocks. Nearest Competitor 110 miles. Write for particulars and pictures. Brokers have you a buyer?

CONCRETE BLOCK & TILE PLANT
P.O. Box 922 Wellington, Texas

POSITIONS WANTED

Position Wanted—As Manager or Assistant with concrete block manufacturing firm. Eleven years clerical and sales, four years managerial experience. Thoroughly acquainted with all phases of production. Excellent references. Box I-20, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Ill.

EQUIPMENT WANTED

WANTED TO BUY

SYNTRO-PAC, MODEL B, air operated block machine. Must be in good condition.

NASSAU CONCRETE PRODUCTS CORP.
Woodside Ave. Baldwin, L. I., N. Y.

USE THE CLASSIFIED COLUMNS OF ROCK PRODUCTS—THE MOST ECONOMICAL WAY TO SELL YOUR USED EQUIPMENT.

WANTED

WANT COMPLETE BLOCK PLANT WITHOUT LAND AND BUILDINGS.

—WILL PAY CASH—

EVERYTHING MUST BE IN FIRST CLASS SHAPE.

Box I-13, Concrete Products, 309 W. Jackson Blvd., Chicago 6, Ill.

CEMENT COLORS

CONCRETE BRICK COLORS
CEMENT COLORS
MORTAR COLORS
made by
BLUE RIDGE TALC CO., INC.
Henry, Virginia

CEMENT COLORS—Write for samples and prices of **"LANSCO" CEMENT COLORS** in bright shades of RED, YELLOW, GREEN, BLUE, BLACK, BROWN. Manufactured by

LANDERS-SEGAL COLOR CO.
73 Delevan St. Brooklyn 31, N. Y.

FREE SERVICE
for BUYERS

Here is the quick way to get information and prices on machinery and equipment. Just check the item (or items) listed below about which you desire information. Then send this page to us, and we will take care of the rest.

TEAR OFF HERE

- Admixtures, Aggregate
- Aftercoolers, Air
- Aggregates (special)
- Air Compressors
- Air Separators
- Asphalt Mixing Plants
- Bagging Machines
- Bags
- Barges
- Batchers
- Belting, Conveyor, Elevator, Power Transmission
- Belting, V-Type
- Belt Repair Equipment
- Bin Level Indicators
- Bins and Batching Equipment
- Blasting Supplies
- Block Machines
- Concrete Building
- Bodies, Trailer
- Brick Machines and Molds
- Buckets
- Bulldozers
- Cars, Industrial
- Classifiers
- Clutches
- Coal Pulverizing Equipment
- Concentrating Tables
- Concrete Mixers
- Concrete Mixing Plants
- Concrete Specialty Molds
- Concrete Waterproofing and Dampproofing
- Conveyors
- Coolers
- Cranes
- Crushers
- Derricks
- Dewatering Equipment, Sand
- Diesel Engines
- Dragline Cableway Excavators
- Draglines
- Dredge Pumps
- Drilling Accessories
- Drills
- Dryers
- Dust Collecting Equipment & Supplies
- Electric Motors
- Engineering Service, Consulting and Designing
- Explosives & Dynamite
- Fans and Blowers
- Flotation Equipment
- Gasoline Engines
- Gear Reducers
- Generator Sets
- Grinding Media
- Gypsum Plant Machinery
- Hard Surfacing Materials
- Hoists
- Hoppers
- Kilns: Rotary, Shaft, Vertical
- Locomotive
- Lubricants
- Mills
- Pulverizers
- Pumps
- Scales
- Screen Cloth
- Screens
- Scrubbers: Crushed Stone, Gravel
- Shovels, Power
- Speed Reducers
- Tanks, Storage
- Tractors
- Trucks, Industrial
- Trucks, Mixer Body
- Trucks, Motor
- Vibrators
- Welding & Cutting Equipment
- Winches
- Wire Rope

If equipment you are in market for is not listed above, write it in the space below.

_____

_____

_____

Send to:

Research Service Department

ROCK PRODUCTS

309 W. Jackson Blvd. • Chicago 6, Illinois

Your Name _____ Title _____

Firm Name _____

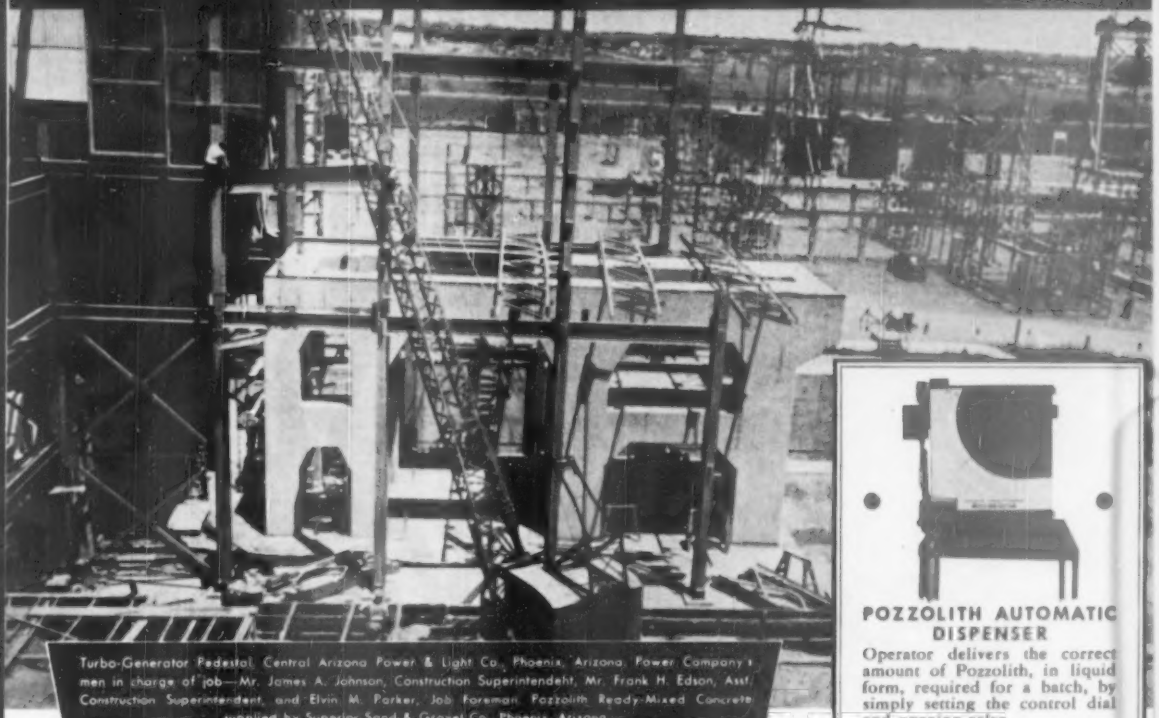
Street _____

City _____ State _____

PLEASE PRINT YOUR NAME AND ADDRESS CP-1

INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

ALSO SEE INDEX OF ROCK PRODUCTS SECTION ADVERTISERS ON PAGES 250, 251



Turbo-Generator Pedestal, Central Arizona Power & Light Co., Phoenix, Arizona. Power Company's men in charge of job—Mr. James A. Johnson, Construction Superintendent, Mr. Frank H. Edson, Asst. Construction Superintendent, and Elvin M. Parker, Job Foreman. Pozzolith Ready-Mixed Concrete supplied by Superior Sand & Gravel Co., Phoenix, Arizona.

POZZOLITH READY-MIXED CONCRETE

Concrete of ideal placeability, readily mobile and with the correct cohesiveness essential to the successful pouring of this monolithic turbo-generator pedestal, was produced with Pozzolith by Superior Sand and Gravel Co., Arizona's leading ready-mixed company.

In addition to easy placeability and assured strength, Pozzolith Ready Mixed Concrete provides these advantages:

1. EASY, ACCURATE CONTROL
2. MINIMIZED SHRINKAGE
3. REDUCED PERMEABILITY
4. GOOD APPEARANCE
5. ECONOMY

Over 400 leading ready-mixed plants in all parts of the country are producing Pozzolith Concrete — and many top design engineers are specifying it — for these reasons.

Write for full information.

POZZOLITH AUTOMATIC DISPENSER

Operator delivers the correct amount of Pozzolith, in liquid form, required for a batch, by simply setting the control dial and opening valve.

OVER 400 LEADING READY-MIXED PLANTS ARE NOW EQUIPPED WITH THIS DEVICE . . .

WHY?

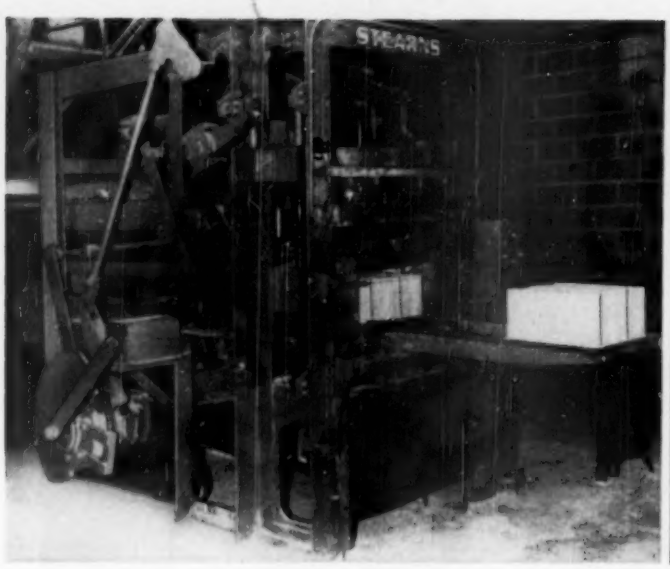
Because a producer can, at lower cost:

1. Produce waterproof concrete . . . with normal Portland cement.
2. Produce high-early strength concrete . . . with normal Portland cement.
3. Produce air entrained concrete without strength loss . . . with normal Portland cement.
4. Produce all of the above properties out of one cement bin . . . with normal Portland cement — stepping up production, reducing inconvenience in handling and cutting costs.

In normal mixes, concrete of any given durability, strength and workability, is produced more economically with Pozzolith than with any other material on the market, added at the mixer or inter-ground.

the MASTER BUILDERS Co.

CLEVELAND 3, OHIO TORONTO, ONTARIO



NEW!

Stearns 50

2-AT-A-TIME CONCRETE BLOCK MACHINE

MORE PRODUCTION PER MACHINERY DOLLAR!

The enthusiasm of old timers for the new Stearns 50 Two-at-a-Time, Plain Pallet, Concrete Block Machine proves it to be another Stearns *first*. The best features ever used in famous Stearns machines are incorporated in the 50—plus many new developments based on exhaustive research and skilled engineering. *Stearns' Revolutionary Dual Shaft Uni-Directional Vibration*—rugged construction—every part readily accessible — anti-friction bearings — fully automatic split cycle operation—finest electrical equipment—positive height control—more production per machinery dollar. Here, old timers say, is the finest two-at-a-time concrete block machine ever to appear on the market! They know!

MODERNIZE WITH A STEARNS!

BACKED BY MORE THAN A QUARTER-CENTURY OF KNOW-HOW!

Descriptions, specifications, service manuals and prices on request. Stearns Consulting Engineers are always at your service.

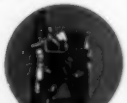
STEARNS

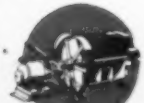
MANUFACTURING COMPANY · INC

ADRIAN • MICHIGAN


STEARNS 15


JOLTCRETES


CLIPPER STRIPPERS


MIXERS


SKIP LOADERS


TURNTABLES


SINTERLITE

2 LINK-BELT SPEEDER K-360 SHOVEL CRANES DIG DEEP FOR HIGH OUTPUT

A thirty-foot face of tough rock is being cut back foot by foot, as two Link-Belt Speeder K-360 Shovels load out the shot rock in the Chandler Materials Co., quarry at Garnett, near Tulsa, Oklahoma.

Making money on operations like this takes tough machinery that stays on the job. Superintendent Ray Malange says these Link-Belt Speeders keep up their end of the schedule, their Speed-o-Matic hydraulic control makes them easy to handle and they are fast and dependable.

Independent Chain Crowd

The Link-Belt Speeder shovel, features the positive Independent Chain Crowd, self adjusting to all boom angles. The Chain Crowd and retract action is controlled by one lever. Positive Independent Chain Drive insures fast accurate positioning of dipper.

FEATURES LIKE THESE GIVE LINK-BELT SPEEDER 300 SERIES THEIR HIGH PRODUCTION AND LOW OPERATING COST

- Heavy duty construction throughout as evidenced by machine weight and exceptional lifting capacity.
- Speed-o-matic hydraulic control — 25% increase in production over conventional mechanical lever control.
- Heavy duty lower and upper main frames — all welded construction — stress relieved to remove all internal stresses.
- Crawler side frames are separate units detachable from lower frame — all welded construction — stress relieved — three interchangeable lengths.
- Steering arrangement designed for exceptional maneuverability.
- Self cleaning crawler tracks; double tread track rollers; superior crawler shoe design.
- Fool-proof crawler drive chain take-up assuring perfect and permanent alignment.
- Efficient, simplified power train.
- Ample engine power — choice of two Diesel engines.
- Independent rapid worm geared boom hoist available.
- Patented retractable high gantry available for long boom operation.
- Fully convertible.
- Chain crowd shovel attachment.
- Distributor service and repair parts facilities.

11-718

LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA

Builders of the Most Complete Line of SHOVELS-CRANES-DRAGLINES

For Screening Highly Abrasive Material

For maximum resistance to abrasion use *heat-treated* Hendrick Perforated Plate on vibrating and shaking screens. It will maintain uniformity of mesh throughout an unusually long service life. Its full clearance obviates clogging, and the ease with which decks can be changed minimizes labor costs.

Hendrick Perforated Plate is available with any desired shape of opening, and can be supplied in any required gauge in tank, high carbon, high tensile, and abrasive resisting steels, and in other commercially rolled metals.

It is furnished either flat or corrugated. Either corrugations or staggered perforations are recommended to offset the tendency of material to travel in straight lines on the sloping surface of the screen. Write for a copy of Hendrick Perforated Plate Catalogue.

SEE OUR CATALOG IN SWEET'S

HENDRICK

Manufacturing Company

Perforated Metals
Perforated Metal Screens
Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Armorgrids

47 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

---

a Leader

GAYCO

Centrifugal Air Separator

The features embodied in the new model GAYCO Centrifugal Air Separator make them a leading means of increasing the capacity and efficiency of all types of grinding mills. They have quick, positive adjustment. When once adjusted they are not affected by variation in speed or rate of feed.

They require very little power to operate. And they feature the exclusive GAYCO principle of rejecting coarse particles by means of a centrifugal sizing fan. They separate 99% through 823 mesh, and give 35% to 50% greater recovery of fines.

● Manufacturers also of "Reliance" Crushers, Screens, Elevators, Conveyors, Bin Gates, Grizzlies. Complete crushing, screening, and washing plants for crushed stone, sand and gravel.

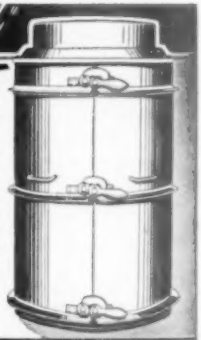
Universal Road Machinery Co.

RUBERT M. GAY DIVISION 117 Liberty St. New York 6, N. Y.

Canadian Representative: F. H. Hopkins & Co., Ltd., Montreal

FACTORY & LABORATORY, KINGSTON, N.Y.

THE "Quinn Standard" FOR CONCRETE PIPE



The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufacturers QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1603 12th ST. BOONE, IA

PERFORATED METAL SAND AND GRAVEL SCREENS

Manufactured exactly to your specifications

Any size or style screen, in thickness of steel wanted with any size perforation desired.

We can promptly duplicate your present screens at lowest prices

CHICAGO PERFORATING CO.
2437 West 24th Place
CHICAGO 8, ILLINOIS
VIrginia 7-6757

CLASSIFIED ADVERTISEMENTS

Single insertion rate $8 a column inch. Larger insertions at lower rates; request classified rate card. POSITIONS WANTED and POSITIONS VACANT (not displayed ads) $1 a column inch an insertion. Terms: Cash with order except for contract advertisers who are billed monthly.

FOR SALE

CRUSHERS

REDUCTION CRUSHER 1—Telsmith Model 32B. Cap. 20-24 tons 7/8". Max. size feed 5". Rebuilt. FOB S. F. $1500

IMPACT CRUSHER 1—Cedar Rapids Kubit size 3. Max. size feed 3". 4 and 6 hammer rotor. Cap. 30-50 tons/hr. Rebuilt. FOB S. F. $2000

CONCRETE MIXER

3—T. L. Smith 4 cu. yd. Model 442. 75 HP G.E. 3-phase, 440v motor. At Knoxville, Tenn.

CONVEYORS

1—42" Belt Conveyor. Capacity 800 tons/hr. Length: 52'. At Knoxville, Tenn.

COAST EQUIPMENT CO.
948 Bryant St., San Francisco
California

Due to closing one of our sand and gravel operations, we offer the following equipment, subject to prior sale or commitment:

Two (2) Model J.C.D. 15-ton Plymouth Locomotives 36" gauge—4 wheels—powered by Caterpillar Model D-13000 145 H.P. diesel engine

One (1) Dorr Sand Classifier 16'x 35' Type Q S F X

One (1) Dorr Sand Washer 12' dia. Type A Serial No. S W 181 D L. H. Drive

One (1) Traylor 6'x16' Sand Scrubber, trunnion driven

Fifteen (15) Eastern side dump cars 36" gauge 5 cu. yd. cap.

Approx. 30 ton rail—75 lb. and 90 lb.

One (1) Farrel Style "B" 36"x18" Jaw Crusher

FOR DETAILS—Address

NORTH JERSEY QUARRY CO.
P.O. Box 599 Summit, New Jersey

READY MIXED CONCRETE PLANT

1—Complete READY MIXED CONCRETE PLANT—Blaw Knox Including the following: 800 barrel bulk cement bin, 100 ton per hour bucket elevator with unloading screw for handling bulk cement; Model 84-S Ransome Mixer (less than 2 years old); 100 ton three compartment aggregate bin complete with cement and aggregate weighing batchers; electric powered gantry and whirley for charging bins, with 2 cu. yd. Clamshell Bucket. Plant in daily operation and can be inspected in the Philadelphia district. Available on or before September 1, 1949. Offered subject to prior sale or commitment.

FURNIVAL MACHINERY CO.
54th & Lancaster Ave., Phila. 31, Pa.

VIBRATING SCREENS

Two deck 7'x18' Seco vibrating screen.
Two deck 5'x16' Selectric vibrating screen.
Single deck 5'x8' Simplicity vibrating scalping screen.
Single and double deck Universal vibrating screen.
Four single deck 3'x5' Hummer vibrating screens.
Single deck 4'x8' Tyler 400 electric vibrating screen.
Double deck 15"x36" Niagara vibrating screen.

CRUSHERS AND PULVERIZERS

Jeffrey 20"x24" rigid hammer pulverizer.
American pulverizer, type 8T T, ball bearing.
Two 8-A 18"x18" Knittel crushers, ball bearing.
Farrell-Blake jaw crusher, 10"x16" A.
Universal 3M No. 3434 jaw crusher.
Jeffrey single roll 18"x18" coal crusher.
Double roll 18"x28" heavy duty crusher.
Allis-Chalmers 3D gyratory crusher.
Lakefoberg jaw crusher and grinders.
Gruendler Aristocrat Peerless grinder, 16-40.

BUCKET ELEVATORS

Ten complete bucket elevators, open and enclosed.
Inclined and vertical elevators with 12"-14"-16" buckets.
Four enclosed elevators with 5" and 6" spaced buckets.
Elevator belt, sprockets, chain, buckets, enclosures, standard elevator, roller and drive ch ins.
Steel thimble roller chain, 1"-6" and 2" 606.

BELT CONVEYORS AND FEEDERS

200' of 20" belt conveyors, roller bearings.
250' of 20" belt conveyors, roller bearings.
100' of 24" belt conveyors, roller bearings.
250' of 24" belt conveyor, plain bearings.
150' of 18" belt conveyors, ball bearings.
240' of 16" belt conveyors, plain bearings.
Belt tripper for 20" belt.
Single strand flight coal conveyor—15" wide 150' long.
Acme feeders 18"-24" and 36".
18" wide new Standard wood apron conveyor 105' long.
Portable belt conveyors, 16" wide 16' long; 18" wide 21' long.
Slat conveyor 20" wide 20' long.
Jeffrey No. 3 and No. 4 electric vibrating feeders.
Screw conveyors and gravity conveyors.

MISCELLANEOUS

I-B overhead 5 ton air hoist, new.
Magnetic belt pulleys.
Y&T 5 ton new crane scale.
100 gear reducers, ½ to 90 HP.
Gearmotors and variable speed motor units.
Electric and air builders hoists.

G. A. UNVERZAGT & SONS, INC.
136 Coit St. Irvington 11, N. J.

FOR SALE

1—Chicago Pneumatic Rubber Tired DR30 Wagon Drill and 1¼" drifter, 6 ft. steel change, 40 pieces new and used drill steel.
1—36" Apron Type Rock Feeder, Iowa Mfg. Co.
1—18x38 Badger Jaw Crusher with V Belt Drive.
1—24"x100' Conveyor with belt.
1—18"x69' Barber-Greene conveyor with belt.
1—18"x66' Barber-Greene conveyor with belt.
1—20" diameter Stearns magnet.
1—12x20 Stearns Magnet.
1—10C Generator, 115 volt.
1—50' Bucket Elevator—40 ton per hour.
1—35' Bucket Elevator—40 ton per hour.
1—Selectro 2 deck 3x10 Vibrating Screen.
17—Screens for above.
1—30x40 Dixie Hammermill.
1—30x30 Dixie Hammermill. Extra hammers and mill bars.
2—Falk Chain Couplings.
1—Sturtevant Blower.
1—Power Board Complete.
1—Set Bins—3 at 75 tons with one ton traveling scale. Westinghouse Motors.
2—Ball Bearing 100 H.P. 1170 R.P.M. electric motors.
2—50 H.P. 880 R.P.M. electric motors.
2—7½ H.P. 55 R.P.M. gear motors.
1—10 H.P. 55 R.P.M. gear motor.
4—5 H.P. 55 R.P.M. gear motors.
3—5 H.P. 1740 R.P.M. motors.

All of the above located at LaSalle, Ill. Subject to prior sale.

CEPHAS WILLIAMS COMPANY
914 E. Main St. Streator, Ill.

FOR SALE

Dempster Dumpster Model L.F. 208 with 2 yd. tilt-type buckets.

DELANEY EQUIPMENT COMPANY
19150 John R St. Detroit 3, Mich.
FOrest 6-0900

Save 50% and More

on

DEPENDABLE USED EQUIPMENT FROM OUR STOCK

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Bay City ½ Yd. Shovel and Crane $5000.
Bay City ⅝ Yd. Crane—90' Boom $7500.
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Cranemaster 5 Ton R.T. for your yard, $2500.
Hyster Karry Krane R.T. for your yard, $2500.
Krane Kars—5 Ton—Swing Boom, $3750.
Hughes Keenan Crane—Diesel Power (New) $6000.

COMPRESSORS AND AIR TOOLS

Davey 105' Portable R.T. Wheels $900.
Chicago Pneu. 160'—Steel Wheels $800.
Sullivan 160'—Steel Wheels $750.
Chicago Pneu. 210'—Steel Wheels $1200.
Schramm 315'—Diesel—Steel Wheels $2500.
Ing.-Rand 500'—Diesel—Steel Wheels $4000.
Ing.-Rand 735' Stationary—150 H.P. Motor $1250.
All types guaranteed Air Tools—50% of new.
Ing.-Rand No. 54 Drill Sharpener with accessories and furnace—$1750.

BUCKETS AND SCRAPERS

Blaw Knox ⅝ Yd. Clamshell Digging $600.
Brosius ½ Yd. Single Line Clam $400.
Owen 1 Yd. Rehandling $650.
Williams 1¼ Yd. Dragline $600.
Hayward 1½ Yd. Orange Peel $1000.
Bucyrus Erie 5 Ton Rock Grab $350.
Sauerman ½ Yd. Crescent Scraper with Double Drum Gas Hoist $1200.
½ Yd. Tip Over Buckets (new) $60.

TRACTORS AND GRADING EQUIPMENT

Intl. TD-9 Dozer Shovel and Blade (1948) $4500.
Intl TD-6 Dozer Shovel and Blade (1948) $4000.
Cat. D-2 Traxcavator $2750.
Cat. D-2 Angledozer $3000.
Cat. D-4 Angledozer $3500.
Intl. TD-14 Hyd. Angledozer $4000.
Intl. TD-18 Cable Angledozer and P.C.U. $5000.
Sweer C Tournapulls Cummins Engines. LP Scrapers guaranteed—$9000.
Bucyrus Erie 3 Yd. Hyd. Scraper $750.
Mississippi 10 Yd. Wagons—Diesel Tractors, "Special".
Hebard Shop Mule—$650.
Hough H.L. Payloader—$3800.

HOISTS

Thomas 50 H.P. D.D. Electric—$2000.
Sauerman 30 H.P. Gas—Scraper Hoist $1000.
G. & S. 40 H.P. Single Drum Elec. $1250.
Lidgerwood 30 H.P. S.D. Elec. $1250.
Clyde 40 H.P. D.D. Elec. $1800.
Swinger Attachment—50-75 H.P. $750.

PORTABLE GENERATORS AND POWER UNITS

Genl. Elec. 18.75 KVA Gasoline Power—110-220 V. 3 ph (new) $1200.
—110 V only (new) $1000.
Kohler 5KW D.C.—$300.
Intl. PD-80 (100 H.P.) Diesel Power Unit $1750.

CONCRETE MIXERS

Ransome 1 Yd. Stationary 25 H.P. Elec. Motor $1800.
C.M.C. 10-8 Portable—Pneu. Tires $500.
Jaeger 10-8 Portable—Pneu. Tires $850.

PUMPCRETES

Rex No. 190 Elec. or gas power; agitators—on skids or track wheels—2" pipe—"Special".

PUMPS

Jaeger 2" S.P. Centrif. $125.
Jaeger 6" S.P. Centrif. $650.
Lawrence 6" Centrif.—40 H.P. Elec. Motor $900.
Jaeger 10" S.P. Centrif.—Gas Power $1200.
C.H.&E. Portable High Press. Triplex, Gas Power—$375.
Ing.-Rand & C.P. Pneu. Sump Pumps $150.

MISCELLANEOUS

Buda Earth Borer—For Truck Mtg. $1000.
Dempster Dumpsters, Model LF $175.
Gar-Bro 4 Yd. Portable Concrete Dapper (new) $1000.
Huber 10 Ton 3 Wheel Roller $1050.
Buff-Spgfield 6 Ton 3 w. Roller Scarifier—$750.
Buff-Spgfield 5-7 Ton Tandem Roller $3000.
Beach Portable Saw Rig—Gas Power $250.
Jaeger AJS Stone Spreaders $350.

THESE ARE SELECTED ITEMS — SEND FOR COMPLETE LIST

RENTAL SERVICE CO.

(Div.—Service Supply Corp.)

4601 No. 4th Street Philadelphia 40, Penna.

34 Years of "Service"

FOR SALE

90 ft. Sauerman Steel Mast, including guy cables, sheaves, blocks, etc. Good condition, purchased new and used less than 2 years.

May be seen at our plant at Michigan City, Indiana.

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P.O. Box 58 Portage, Wisconsin

FOR SALE

Four (4) 8'3"x45'11" Efficient Multitube Indirect Rotary Coolers by Traylor for Lime and Alumina Oxide.

THOMAS M. BROWN
1315 Oliver Bldg.—Pittsburgh, Pa.

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT CLASSIFIED ADVERTISING IN CONCRETE PRODUCTS SECTION

FOR SALE

ROTARY KILN:
1—8'x125' Reeves Bros., double and triple riveted, butt strapped, ⅝" shell, with firing hood. Refractory brick removed, now on wooden cribbing alongside railroad siding in 1—125' piece, for immediate shipment. Excellent condition.
Also complete 2'x12' Experimental Rotary Kiln.

ROD MILLS:
2—6' dia. x 12' long Allis-Chalmers, each with chrome steel wave type liners, herringbone steel gears, arranged for direct motor connection through speed reducer.

RAYMOND PULVERIZERS:
1—No. 5047 4-roll Raymond high side with "whizzer" air classifier and auxiliary equipment.
1—4-roll Raymond high side, equipped with double cone various separator and aux. equipment.
2—4-roll and 5-roll Raymond low side.
1—No. 352 Raymond Bowl Mill—Coal Pulverizer.
6—Nos. 1, 0, 00, 000, 0000 pulverizers.

OLIVER VACUUM FILTERS:
1—6'x4' ALL STAINLESS STEEL, top feed type, UNUSED.

1—6'x12' acid proof, wood load and rubber fitted.
5—8'x10' all steel, used six months.
3—8'x10', enclosed steel drums, wood staves.
3—11'6"x18', all steel.
1—6'x6', steel drum, wood staves.

JAW CRUSHERS:
60"x42" Farrell, 24x36" Farrell, 32x50" all steel frame Champion, 25x40" and 20x36" Cedar Rapids, single shaft, roller bearing; 20x36" Pioneer, 18x36" Farrell, 16x24" Telsmith, 10x40" Good Roads.

GYRATORY CRUSHERS:
36" Superior McCully, No. 20A Telsmith.
20" Superior McCully, No. 9K Gates; No. 16B, 12B and 10B Telsmith.

GYRATORY FINE REDUCTION CRUSHERS:
1—No. 3122R Allis-Chalmers; 2—Traylor Type TY 1'8" and 2'4", also 3' TZ; 1— 36" Telsmith Gyrasphere.
1—No. 848R Allis-Chalmers, Unused, with 100 H.P. motor.
1—18" Telsmith Intestone.
1—3' Symons Cone with coarse and fine bowls.
1—3' Symons Cone with fine bowl.
1—5½' Symons Cone, standard, with fine bowl and 150 H.P. motor.

2—5½' Symons Cone, short head type, each with 150 H.P. motor.
8—Kennedy, No's. 19, 258, 278.
1—No. 46B Telsmith, 7" feed, 1-⅝" discharge.

VIBRATING SCREENS:
10—Tyler Hummer Battery 3'x5' No. 33, single deck; 4'x8' No. 37 single deck; battery 4x5' No. 31, double deck; Tyler-Niagara 4x12' No. 606, three deck; 4x10' No. 28, single deck; 3x10' No. 38, single and double deck.
2—4'x8' triple deck Selectro, Productive Equipment Co. of Chicago, V-belt drives. Also No. 185, 16"x5'.
1—5x10' Allis-Chalmers "Le-Hed" single deck. At Newark, N. J.
2—Unused Tyler Tyrock 5x15', double deck.
1—4x12' Allis-Chalmers, Style "L," triple deck.
1—4x12' Symons, single deck.

Also single and double Roll Crushers; Ball, Tube and Pebble Grinding Mills; Air Classifiers; Swing Hammer Mills; direct and indirect heat Rotary Dryers; Cranes, Draglines and Shovels; Air Compressors; Locomotives, etc.

THE KEY TO SAVING TIME AND MONEY
CONSOLIDATED PRODUCTS COMPANY, INC.

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Shops: 335 Doremus Ave., Newark, N. J.
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80-D Northwest 2½ cu. yd. diesel crawler shovel rebuilt and guaranteed
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HODGE & HAMMOND, INC.
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FOR SALE

(1) 10' ID x 150' Kiln with ¾" shell, firing hood (all complete), Worthington Allis-Chalmers tires, 9'2" face on 4 cradle rocker rolls 30" D x 2'4" face with Falk spur gear speed reducer, 2000 to 212 RPM, also new fire brick liners.

OLLIE E. LAWRENCE
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DEPENDABLE USED MACHINES

Special—New Morris 10" gravel pump; less than ½ price

Pioneer 4x8, 2-deck screen	B-G 24"x40" port. belt conveyor	Silent Hoist Krane Krawler
Pioneer 4x10, 2-deck screen	Pioneer 42"x14' apron feeder	1-4 with front end loader
Robins 3½x16, 2-deck screen	Robins 18" belt conveyor	Unit, ¾ yd. crawler crane
Day No. 5 hammermill	Chrysler Ind. power unit	1-4 universal truck crane
RD-7 with bulldozer	Int. UD-18 power unit	Ryers Model 83 dragline

All above equipment reconditioned in our own plant.

10030 S. Ridgeland Ave. TRACTOR & EQUIPMENT CO. Oak Lawn, Ill.

FOR SALE

B.E. 85-B 3½ cu. yd. shovel-electric.
N.W. Model 6—1½ yd. N.W. Model 80—2 yd.
Lima 1201—Cummins Engine—3 cu. yd. shovel.
22B—¾ yd. Comb. others.
Tournapulls—Euclid trucks—Locomotives—dumpcars—Cranes.
Rotary Kilns—Dryers—10'x90'—10'x170'—others.
250 KVA—440 volt—G.E. Diesel Driven Generator set like new.
48" Gyrasphere Crusher complete—Gyratory crushers—Roll Crushers Jaw Crushers—60"x42"—24"x36"—20"x36"—18"x36"—15"x36"—10"x36" — Complete crushing plant including 42"x36" Jaw. Others. Cone Crushers—Rod Mills—Roll Crushers—Feeders—Classifiers—pumps—mine hoists—tuggers—Motors—Transformers—Conveyors—Portable gravel Plants—Blast Hole Drill.
Many other Items.

STANLEY B. TROYER
Theatre Building Crosby, Minn.

CRUSHERS: 10x20 Austin, 10x36 Cedar Rapids, 30x18 Allis C. 36x24 Kennedy, 40x48 Buchanan 42x66 Farrell 24W, No. 5398 and 848R Allis C. 14" and 36" McCully GYR. 2, 3, 5½' Symons CONE.
3630 and 3640 Dixie Hammer Mills.
6x6' Hardinge Conical Ball Mill Equip.
150 ton Steel Storage Bin
23 Koppel 5 yd. 2-way Dump Cars 36" ga.
24"x30" Barber Greene Port. Belt Conveyor
Hales 75 Loaders, 1 yd. Hough Diesel Payloader
10 Gar-Wood Winch Assemblies, no power
30 ton Vulcan std. ga. Diesel Locomotive std. ga.
16" Dredge, AMSCO pump, Seintek Ladder, etc.
3 yd. P&H 855 Diesel Draglines
5'x40' 5½'x40' Rotary Dryers
SHOVELS: ½ yd. NW 18, ⅝ yd. Unit, ⅝ yd. Lima 34, 1¼ yd. Bay City, Bucyrus E2 1½ yd. NW 6 GAS, 1½ yd. Koehring 605, P&H 655, Lima 602 DIESEL.
Motors: ½ to 800 HP New and Rebuilt.
Vib. Screens-Repres. Univer. Vib. Screen Co.
Also many used ones.

MID-CONTINENT EQUIPMENT CO., INC.
6677 Washington St. Louis 5, Mo.
Pa. 2290

1—Fairbanks Morse Diesel Engine, Model 36A5½8, 6 cylinder, HP Cont. 90, RPM 1100, Maximum HP 140, Serial No. 794682, equipped with Twin Disc Clutch Co. single disc clutch, Model BD14 P1, Spec. No. 10229
1—Electric Controller & Mfg. Co. 230 volt No. 8 Type SW Lifting Magnet E.M. 53053 (with control) Serial No. 467850

THE MARYLAND SLAG CO.
Pier 2, Pratt St. Baltimore 2, Md.

FOR SALE

Complete Sauerman cableway outfit for sand and gravel consisting of: 85 ft. structural steel mast, guy cables; 1 cu. yd. cableway bucket; 3 wheel carrier; 500 ft. new track cable with tension blocks and sheaves. New head and tension cables; 100 H.P. Ont. Diesel. All in good condition. Price $4,000.

O. W. SMITH
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FOR SALE

2—used Kennedy-Van Saun secondary crushers No. 49 complete with 75 H.P. motors, including control equipment and spare parts.

National Portland Cement Co.
Brodhead, Bethlehem, Pa.

FOR SALE

6 Horburgh-Scott Worm Gear Speed Reducers Type WD—400 to 1 Reduction, good as NEW
Wiley All Steel Whirley full swing, 60' Boom, 10 Ton Cap. with Three Drum Hoist 3 Ph. 60 Cy. 220-440 V. Elec. Motor and with Separate Motor Drive Swinger, excellent condition
6" Goulds Centr. Pump connected to 30 Hp. 3 Ph. 60 Cy. 220-440 V. Motor. 1000 GPM 85' Head for Gravel Plant or other purposes.
20 Ton Steel Stiffleg Derrick 85' Boom 45' Mast Stiff and Lie Legs, excellent condition
D7 Caterpillar Diesel Tractor with L.P. Str. Blade Dozer very good
Wayne Crane and Pull Shovel on Rubber. Excellent condition ½ yd.
Michigan TLTD ½ Yd. Crane Dragline, on Rubber Excellent
Caterpillar D13000. Diesel Elec. Generator, 95 KW, 3 Ph. 60 Cy. 220 V. on Skids good as new condition
27E and 34E Pavers both in very good condition
We have Tractors, Crushers, Rollers, Euclids, Cranes, Shovels, and All Kinds of Equipment. TELL US WHAT YOU WANT TO BUY OR SELL

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USED EQUIPMENT FOR SALE

3—Bucyrus Erie Steam Shovels ⅝ Yd., 1 with Caterpillar, 2 with Wheels. Condition—Good. Price $1,000.00 each.

5—Wisconsin FV-4 Air Cooled Motors—Practically new. Price $200.00 each.

1—Falk Speed Reducer No. 9-DA—100H.P. with Motor Base, complete with Falk Coupling and Fast Coupling. Condition—Excellent. Price $1,000.00.

1—Link Belt Rotating Screen 4'x18', Complete with extra screen plates 6" to 2" openings. Condition—Good. Price $400.00.

1—Yale Electric Lift Truck—Model KMS0-2M 2,000 lb. Cap. with Hoist and Trolley, includes 2 Exide Batteries, 1 Charger and 10 Self Dumping ¾ ton Steel Hoppers with Casters. Condition—Excellent. Price upon request.

1—Continuous Clyde Hydrator Plant Cap. 5 tons per hr. Complete with Feeder, Raw Lime Bin, Beater Mill, Cyclone, 25 ton Storage Tank, Crusher and Elevator. Condition—Good. Price upon request.

1—Pebble Lime Plant including Roll Crusher, Elevator and Screen. Condition—Good. Price upon request.

THOMASVILLE STONE AND LIME COMPANY
THOMASVILLE, PENNSYLVANIA

DIESEL LOCOMOTIVE: Plymouth 25 ton, standard gauge, D-17000 motor, air brakes.

TRUCK LOADER: Haiss model 75-C, heavy duty, gasoline powered. Rebuilt.

CLASSIFIERS: 1—New 78"x25 ft., manganese fitted, with tank and 10 H.P. motor, etc. All complete, NEW condition. Also, one 36"x28 ft. and one 24"x10'9" with 2 H.P. motor.

COMPRESSORS: Ingersoll Rand 315 cu. ft., portable, diesel. 2—Steam, 18x29x16 and 26x20, 110 lbs. steam pressure.

SHOVELS and DRAGLINES: 1—P&H model 855 combination Shovel and Dragline.

1—Lima 802, 2½ yd., diesel, combination Shovel and Dragline.

1—Lima 1201, 3 yd., diesel Shovel. Also 802, 2 yd.

1—Northwest 80-D, 2½ yd. diesel Shovel.

1—Bucyrus Erie 54-B, diesel.

1—Bucyrus Erie 85-B, electric, 3½ yd.

BLAST HOLE DRILLS: Bucyrus Erie 29-T Electric, 440 volt, and one NEW gasoline driven; both with 9" bits and tools.

KILNS, COOLERS, DRYERS: 1—Single Shell 34"x20 ft., complete with drive, burner, no motor. 1—Christie RV, 80"x50'. 1—10'x90' heavy duty type Dryer, complete with dust collector and all auxiliary equipment. 1—Traylor 54"x40', single shell Dryer. 1—Ruggles Coles class XF12, 80"x60' long, double shell, Dryer. 1—Traylor single shell 60"x40'. With or without motors.

HARDINGE MILLS: Conical Ball Mills, 8'x20" and 8'x30", manganese steel lined. Herringbone gears with motors and V-belt drive. 1—6'x36", silex lined. 1—7'x9' manganese lined, with or without 250 H.P. synchronous motor. 1—8'x20" and 10'x72" steel lined, with or without motors. 1—3'x8' steel lined Rod Mill. 1—6'x48" air swept mill with heater, dust collector, electric control equipment, etc. New 1948, used two days.

VIBRATOR FEEDERS: 1—F55 Syntron 36"x78" flat pan trough. 1—Jeffrey No. 5 with two power units. Both units complete, 440 volt.

GYRATORY CRUSHERS: All sizes 8"x30" to 42"x134".

JAW CRUSHERS: All sizes 4x6 to 48x60".

REDUCTION CRUSHERS: Telsmith 3 ft. Cone; Telsmith 32B complete with V-belt pulley; Symons 5½ ft. short head, one coarse bowl, one fine bowl; Symons 2 ft. Cone.

SCREENS: Pioneer 5x8' Scalper; Robins Gyrex 4x7', double deck with motor and drive; Nordberg 5x16' Scrubber; 4x12', 4 deck, flat Screen, and 4'x8' bar type, single deck.

DRAG SCRAPER UNIT: Sauerman 3 yd. Crescent bucket, 150 H.P., two drum Hoist.

GOODRICH SUPER LONG LIFE CORD CONVEYOR BELT (NEW): Large quantity of Goodrich Belt 42" wide, 6 ply, 42 oz. duck, 7/32" top cover, 1/16" bottom cover, on original reels, all NEW, NATURAL RUBBER, with or without mechanical parts.

A. J. O'NEILL
Lansdowne Theater Building
Lansdowne, Pa.
Phila. Ph.: Madison 3-8300 - 3-8301

AIR COMPRESSORS—I. R. Centrifugal, 4-stage single flow, 6500 CFM, 10 lbs., M.D. (Unused). Fuller, Rotary, Type C-300, Single Stage.

CONVEYORS—L. B., Flat 24" wide, 30' CC. Rapid reversible power booster Mod. RPBC—1516, 16"x15".

CRUSHERS—
No. 6K Allis-Chalmers.
No. 5K Allis-Chalmers.
No. 6 Williams Hammer.
Jeffrey Swing Hammer Mill 36"x24", A2.
Stedman Mill, 4-cage, 36".
Williams Hammermill No. 3.

DIESEL GENERATORS—60 KW G.M. 6-71RC, 3/60/127-220, complete. Used only 100 hrs.
100 KW Hercules DNX-6, 3/60/127-220. Unit completely enclosed.
100 KW Superior GDB-8, 120/240 DC, comp.

DRYERS and KILNS—4'x30'x⅜", Traylor.
7'x45'x½", Link Belt.
3'10"x16' Link Belt, Roto Louvre.
7'6"x125', Allis-Chalmers.
6'6"x50', Vulcan.

ELEVATORS—BUCKET—Webster, 48', MI Buckets, 14"x7".
Jeffrey, 68', MI Buckets, 10"x6".

FANS & BLOWERS—From 1000 to 53000 CFM.

FEEDERS—VIBRATING—Syntron Type F33.
Jeffrey, 18"x36".
Allis-Chalmers, 36"x12"x6'.

FILTER—5'4"x6' Oliver, continuous, wood drum, complete with accessories.

PUMPS—Centrifugal—from 20 to 2500 gals. Vacuum, Stokes, Mod. 212C, 100 CFM.

REDUCERS—Ratio 4-1 to 263-1, 3 to 10 HP. Vari-Speed, ratio 2-1 to 6-1, 3 to 7½ HP.

STACKS—5'3"x110', welded, 5/16" and ⅜". 42"x37' high, 5/16" and ⅜".

Heat and Power Co., inc.
70 PINE STREET — DIGBY 8-0373 — NEW YORK 5, N. Y.

TOP PRICES PAID FOR SURPLUS EQUIPMENT

FOR SALE

225 HP Busch Sulzer 150 KW diesel engine generator set

1¼ yard Bucyrus Erie 43-B diesel crane-dragline new 1943

30 ton Davenport diesel switching locomotive new 1942

30 ton Orton locomotive crane diesel powered built 1942

150 HP portable firebox boiler. ASME Code. 250 lb. steam pressure.

Mississippi Valley Equipment Co.
513 Locust St. St. Louis 1, Mo.

PUMPCRETES

1—REX PUMPCRETE, Model 160 Double, Completely Overhauled, Gasoline Engine Driven, Latest Model Machine with Selective Drive Transmission, with approximately 1,000 lin. ft. 7" Pipe.

FURNIVAL MACHINERY CO.
54th & Lancaster Ave., Phila. 31, Pa.

CONSULT US BEFORE BUYING OR SELLING USED FARREL-BACON CRUSHERS SIZES 60"x48" to 10"x7"

As manufacturers of these machines we are in a position to assure you as to condition and operating ability. Send for catalog.

149 Broadway BACON-PIETSCH CO., INC. New York 6, N. Y.

USED DREDGING AND SAND & GRAVEL PLANT EQUIPMENT ON HAND

Write giving your needs

J. W. MECKENSTOCK & CO.
53 W. Jackson Blvd.
Chicago 4, Ill.

Complete rock quarry equipment for sale; including: Loader — Cletrac. Sargent overhead air compressor—105 cu. in. Chicago Pneumatic, 16"x24" jaw crusher. 90 H.P. Continental Gas engine. 30 ft. belt conveyor. D-13000 Cat. Diesel power plant, 22" Gilson pulverizer.

WALTER L. JOHNSON
Emmett, Kansas

FOR SALE

Caterpillar DW10 Tractor with W10 Wagon.

Lorain ¾ yd. dragline Diesel L-41.

B. L. LARSEN & SON
203½ Main St. Cedar Falls, Iowa

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18 TON LOCOMOTIVE

Plymouth 0-4-0 standard gauge, automatic couplers and brakes, built 1942, excellent condition, available at less than 50% of cost.

CONSOLIDATED MILL SUPPLY CO.
Chicago 36, Ill. WA 5-3330

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1 2' SYMONS STANDARD CONE CRUSHER Serial No. 2286

1 36" STEDMAN IMPACT TYPE CRUSHER

Crushers will be available about February 1, 1950; are now in operation; can be furnished with motors and drive. Are replacing with larger machines.

OHIO VALLEY SAND COMPANY
New Martinsville, W. Va.

FOR SALE

Bucyrus-Erie 200-B electric shovel, mounted on caterpillars; 10 cu. yd. bucket; shovel in excellent condition; has been used loading coal in strip mine. Reason for sale, we have installed 17 cu. yd. Bucyrus-Erie 550-B. Specifications and photographs sent on request.

NORTHWESTERN IMPROVEMENT CO.
Colstrip, Montana

FOR SALE

Autoclave, 6 ft. 6 in. by 80 ft., ⅝ in. shell. Rotary brick press, Jackson & Church, Model A with motor, material hopper and feeder. Rod Mill 4 ft. by 8 ft. Jackson & Church with 50 H.P. motor. Double drum hoist with 20 H.P. Motor. Moorehouse portable, hydraulic brick testing machine.

THE CITIZENS HOMES CO.
1013 S. Michigan Ave. So. Bend, Ind.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at Attractive Prices. Large Stock. New and Rebuilt. All fully guaranteed. Send us your inquiries.

V. M. NUSSBAUM & CO.
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PIPE—Small and Large Diameter, from our Stock

Welded,
Seamless
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Supplies of Fittings
Valves and Tube Turns
Power Piping Fabrication
SPEED-LAY Pipe System
Quick Assembly
Economical, Light Weight.

ALBERT PIPE SUPPLY CO., INC.
Berry at North 13th Sts., Brooklyn 11, N. Y.
Phone EVergreen 7-8100

DIESEL SHOVELS and DRAGLINES

120B Elec. Shovel, 4 yd.
85B Electric Shovel, 30' boom, 19' handle, 3½ yd.
1—Lorain 82 Std. shovel
1—1006 Osgood strip, 45' boom, 35' stick, 2 yd.
1—2900A Manitowoc, 24' boom, 18' stick, 1½ yd. 80' D. L. boom, fairleads
1—80 D.N.W. 30' boom, 22 stick, 2½ yd.
1—P&H 1055 L.C. 2½ yd. 1948, shovel.
1—P&H 1655, 3 yd. 1948, shovel
1—820 Lorain 24' boom, 18' stick, 2 yd.
1—80' Manitowoc, Boom, Fairleads, drum lagging, sheaves, 95% new
1—8D Caterpillar bulldozer, cable
¾—2—2½—3—4 and 5 yd. shovel dippers
4—Mack side dumps, HRS Cummins, 25 yd.
15 yd. Garwood Carryall Pan, $2200.00
1D Cletrac and angledozer, diesel, rebuilt
2—30 H.P. G.E. Motors, 1200 RPM 3/60/220
30x18 Allis-Chalmers Jaw Crusher.
6D Caterpillar diesel Angledozer. Good
20 and 25 ton Gas and Diesel Locomotive Std. Ga.
2—30 ton Brownhoist Diesel Cranes, and Wheel
75 H.P. Slip Ring Motor, 580 RPM
1—Model 22 Marion Steam Shovel, 1¼ yd.
Northwest Backhoe Assby., 25' boom, 1 yd.
1—Jeffrey No. 5 Electric Vibr. Unit.
Stephens-Adamson Pan Feeder, 24"x3'2"
1—Kennedy VS. 7'x110' rotary kiln.
2—Bonnot 8'x115' rotary kilns.
1—7 or 8' dia. x 50' rotary coolers.
1—Sauerman Double Drum Hoist with ¾ yd. bucket.
1—New 40' boom, 2 yd. dipper for 1006 Osgood

McCARTNEY MACHINERY COMPANY
Church Street — Youngstown 10, Ohio

FOR SALE

2-ft. Standard Symons Cone Crusher Completely rebuilt—New Machine guarantee.

Call or Write
JACK BOND
2519 S. Kinnickinnic
Milwaukee 7, Wis.

JOIN
11,895
PRODUCERS
WHO
REGULARLY
READ
ROCK
PRODUCTS

MINE AND SLOPE HOISTS

1—20,000 lb. Dbl. Drum Mundy w/o motor.
1—26,000 lb. Nordberg Sgl. Drum
1—10,000 lb. Nordberg Sgl. Drum AC
1—17,000 lb. Ottumwa Sgl. Drum AC
1—11,000 lb. Ottumwa Sgl. Drum AC
1—16,000 lb. Allis Chalmers Sgl. Drum
1—30,000 lb. Allis Chalmers Dbl. Drum AC
1—7,000 lb. Allis Chalmers Dbl. Drum AC
1—7,000 lb. Flory Sgl. Drum AC
1—10,000 lb. Wellman AC

CRUSHERS AND SCREENS

1—12x16 Eagle Dbl. Roll
1—18x20 Eagle Dbl. Roll
1—3B American Pulverizer
1—30x54 McNally Pitts. Sgl. Roll
2—24x20 Jeff. Flextooth
1—258 Kennedy VanSaun Gearless
1—Superior McCully 8" Gyratory
1—30x36 S. A. Ring type Knittel (never used)
2—4x10 S. A. Vibrating Screens
4—Tyler Vibrating Screens

CARPULLERS AND LOADERS

1—5000 lb. Jeffrey Carspotter AC
1—6000 lb. Brownie Carspotter AC
1—5000 lb. Link Belt Carspotter AC
1—S. A. Heavy Duty Loader AC

MISCELLANEOUS

1—5 ton Merrick Weightometer
2—2½" Dayton Dowd 300 GM Cent. Pump, AC motor
1—48" Colo. Simplex Classifier
2—100 ton, 5 sheaves; 2—50 and 2—40 ton 4 sheave blocks, complete, new.
1—11B Sullivan Cutter with Bowdil bar, chain and bug duster, 50 HP DC motor
1—PL1114 Joy Elevator, 10 HP DC, permissible motor
1—B. E. 3¼ yd. Electric Shovel R85

Hawkins & Co.
128 So. Michigan Ave., Chicago 3, Illinois
Telephone HArrison 7-0725

GYRATORY: 30", 36", 42" and 48" Allis-Chalmers; also Nos. 12, 10, 9, 8, 7½, 6, 5 and 4.
JAW TYPE: 24x36, 25x40, 22x50, 30x42, 40x48 42x48, 48x60 and smaller sizes to 7x9.
REDUCTION TYPE: 2, 3, 4, and 5½ ft. Symons Cone; Nos. 19, 25, 37 and 38 Kennedy; 36" Traylor TZ, 1'8"x2'6" TY; No. 36 Telsmith Gyrasphere; 7, 10, 14" Newhouse; Stedman 30 and 36" Impact.
ROLLS: Allis-Chalmers 72x30, 54x24, 54x20, 40x15 & 18x10, Pioneer 18x30, Universal 16x24, New Holland 24x16 & 16x16; McLanahan 30"x60", 18x24 & 18x30 Single Roll. Also others.
HAMMERMILLS: Williams Nos. 2, 3, 4 & 6; Day No. 40 & No. 70; Gruendler 2XB & 3XB; Dixie 2024 & 3650.
MILLS: Hardinge 3'x8", 6'x22", 6'x3', 8'x3' & 8'x4'; Kennedy 4x8, 5x6, 5x11; Marcy 4x5, 6x4; Smidth 16B Tube Mills; Raymond 4 & 5 Roller Mills; Bonnot, Fuller, Sturtevant & others.
CRUSHING PLANTS: 25x40 Cedar Rapids Portable, Diesel Power. Others portable & stationary.
BINS & BATCHERS: 70 & 150 yd., 3-compt., Etc.
TRUCKS: Euclids, FWD, Internationals, Etc.
SHOVELS: 80-D Northwest 2½ yd. combination Link Belt Speeder K-380, 3 yd., and others.
DRAGLINES: 6 Yd. Walker, 145' boom, Diesel Lorain Model 40-A Crane-Dragline, Diesel.

MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Elevators, Excavators, Generators, Hoists, Kiln, Draglines, Drag Scrapers, Dredges, Drills, Engines, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

MARIETTA — ALEX T. McLEOD — KANSAS

FOR SALE

Orton ½ yd. crawler shovel powered with 6 cyl. Waukesha gas engine. Working every day. A bargain at $2500.

H. S. CATRON
Junction City, Ky.

SHOVELS—CRANES—DRAGLINES

Lima 1201, 2½ yd. Diesel Shovel.
Northwest 80D, 2½ yd. Diesel Shovel.
Northwest No. 6, 1¾ yd. Diesel Shovel.
Lorain 820, Diesel Crane, 90' boom.
Lorain 79, 1¾ yd. Diesel Shovel.
P&H 1225, 2½ yd. Electric Shovel.
Northwest Model 25, ¾ yd. Diesel Shovel
Marion Model 37; 1¾ yd. Elec. Shovel
Marion Model 450; 1½ yd. Elec. Shovel
Osgood 2 yd. Diesel Crane, Engine overhauled

CRUSHERS

JAW: Acme 10x20, 14x26, 14x28, 10x42, 16x32, 18x32.
Cedar Rapids 20x36, 25x40.
Farrell 10x20, 18x30, 14x26, 42x40, 42x60
Buchanan 36x42, Type C 40x48.
Good Roads Reliance 15x30
Traylor 18x36, 24x36.
Austin Western 25x40
Allis Chalmers 30x18.
Good Roads 10x30.
Telsmith 18x32.
Champion 1030, 1040, 1236, 1530.
GYRATORY: Allis Chalmers-McCully, 6", 7½", 8", 9", 12K, 20", 30".
14" Newhouse, 24" Gyrasphere, 9K, 6K, 5K, Gates.
Telsmith 5H, 10-B, 13-B, 16-B.
Kennedy Van Saun 7, 19, 25½-S, 38
Traylor Ty-1-8, TZ No. 6.
ROLL: Allis-Chalmers 54x24, Diamond 40x22, Pioneer 30x18, Telsmith 24x16, McLanahan & Stone 18x12, New Holland 24x16.
HAMMER MILL: Size 4 Williams Jumbo, Pennsylvania 8X2, 22x22, Cedar Rapids 20x22, Jeffrey 36x42, Jeffrey 36x24, 36x40 Dixie 3650.
BALL MILL: Allis Chalmers 4'x4', 5'8"x18', Kennedy Van Saun 7'x5'.
ROD MILL: March 2'x6', 3'x6', Allis Chalmers 4'x8', Hardinge No. B 206.
PULVERIZER: Williams 30 Slugger, Day Model 70
TUBE MILL: Ken. Van S. 5'x8' air swept, Smith 16R 5'6"x20'
PEBBLE MILL: Hardinge conical, Abbe 6'x12'.
RAYMOND MILL: Low side 4 roller with equipment.
Hardinge 4'x1' air swept ball mill with heater attachment. Complete.

TRANSIT MIXERS

Ransome 1 yd. on Autocar chassis.
Jaeger 5 yd. separate engine drive, skid mounted
10 Jaeger 6 yd. agitators completely rebuilt
Jaeger 3 yd. High dump, completely rebuilt.
Rex 6 yd. agitator on Diamond T. #48

CLASSIFIERS AND VIBRATING SCREENS

Selectro 3 deck heavy duty type screen.
Pioneer 4'x10' Scalping Screen. New 1948
Robins 4'x10' double deck.
Diamond 3 deck Mogul screen. 4'x12'.
Pioneer 4'x8' double deck.
Dorr 8'x28'8" Type DSD Classifiers
Dorr 2'x15' Type 8SFR Classifiers
Dorr 2'x15' Type 8DFR Classifiers

CABLEWAYS

Sauerman Slack line 1 yd. complete with Jaeger Diesel hoist. Practically new.
Sauerman 1½ yd. 70' mast 150 HP Elec. Hoist
Sauerman 1 yd. with Waukesha gas hoist.

TRACTORS

2 Cat. D8s Ser. 2U with bulldozer, DDPCU
Cat. D8 Series 8R, angle dozer and DDPCU
Cat. D8 Series 8R, stg. bulldozer DDPCU
Cat. D7 Series 4T Cable controlled dozer
Cat. D4 with T4 traxcavator 1 yd. bucket

READY-MIX CONCRETE PLANTS

Blaw-Knox 400 tons 4 compt. aggr. bin with weigh batcher and Kron Dial Scales.
New 100 tons aggr. bin 2 compts with weighbatcher and scales. Just completed. Guaranteed.
Butler 300 ton 3 compartment 2 aggregate and one 150 barrel cement, complete with weighbatchers.
Blaw-Knox 105 ton aggregate bin, 3 compts.
Butler 105 bbl. bulk cement bin, complete.

ASPHALT AND CRUSHING PLANTS

B-G Model 848 Bit. Concrete Mixing
B-G Model 879A Finisher.
Pioneer 154V Crushing and Screening, complete
Madsen Asphalt 3000 lb. cap. Complete.
Cedar Rapids Model B Asphalt Plant Complete
Cedar Rapids "Speedline" Asphalt 1000 lbs
Iowa Model 2A Crushing and Screening
Universal 800 Crushing Plant, portable on pneu.
Cedar Rapids Pitmaster straight line screening and crushing.
Cedar Rapids Two unit mobile crushing.
Cedar Rapids Model AAA Crushing.

LOCOMOTIVES AND DUMP CARS

8 Koppel 5 yd. 36" Ga. Dump Cars.
10 Western 4 yd. 36" Ga. Dump Cars
Plymouth 35 ton gas loco. std. gauge
Whitcomb 12 ton 36" gauge, Diesel.
G.E. 45 ton Diesel-Elec., std. ga.
Vulcan 12 ton gas std. ga.
2 Porter steam Locs. 12 tons, 36" Ga.
Vulcan 25 ton Steam Loco. Std. Ga.
Plymouth 30 ton std. ga. Gas. Loco.

DERRICKS

American 50 ton stiff leg derrick 100' Boom
Custom built 25 ton stiff leg 110' Boom
Lambert 25 ton Guy derrick 115' bm.
American Terry 20 ton Guy Derrick 100' bm.
American Terry 20 ton stiff leg with hoist
American Terry 18 ton steel stiff leg derrick
Lambert Steel Guy Derrick 20 ton cap.
Harris 50 ton Guy derrick 100 ft. mast, 90 ft. boom

RICHARD P. WALSH CO.
30 Church St. — New York, N. Y.
Cortland 7-0723 — Cable: RICHWALSH

RELAYING RAIL
TRACK ACCESSORIES
MIDWEST STEEL CORPORATION
CHARLESTON 21, W. VA.
KNOXVILLE, TENN. - PORTSMOUTH, VA.

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT CLASSIFIED ADVERTISING IN CONCRETE PRODUCTS SECTION

VIBRATING SCREENS
CONVEYORS—FEEDERS
SCALES—CRUSHERS
CONVEYOR IDLERS

Guaranteed Equipment
Immediate Shipment

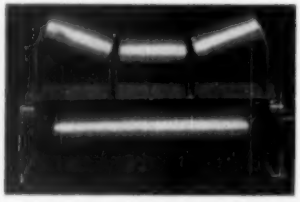
VIBRATING SCREENS

100 machines in stock; screen sizes 2'x5' to 5'x14'; 1 to 5 decks. Positive throw eccentric shaft types); also eccentric weight types.
Prices from $395.00

CONVEYORS — PICKING TABLES

Troughing Idler conveyors—picking tables. Any length, belt widths to 60".
Prices from $395.00

TROUGHING IDLERS AND ROLLERS



All steel. Interchangeable with other well-known makes. Replaceable precision ball bearings with alemite fittings. No bearing adjustments required. Easy to start and will run in cold weather. Rust-proof ball races; maintenance is negligible. Build your own conveyors: we have standard sections, head and tail pulleys, take-ups, drives, idlers, speed reducers, sheaves, belting, etc.

3-roll Troughing Idlers for these sizes:

14" belt	$18.50	24" belt	$21.00
16" belt	19.00	30" belt	22.00
18" belt	20.00	36" belt	23.00
42" belt	24.00		

1-roll Returning Idlers for these sizes:

24" belt	$ 8.25	36" belt	$ 9.75
30" belt	9.00	42" belt	10.50
48" belt	11.25		

HEAVY DUTY PLATE AND PAN FEEDERS

15 to 35 ton per hour capacity	$150.00
28 to 60 ton per hour capacity	190.00
50 to 100 ton per hour capacity	575.00
100 to 175 ton per hour capacity	800.00

TRUCK SCALES

15 Ton Truck Scales	$450.00
20 Ton Truck Scales	510.00
26 Ton Truck Scales	565.00

Others to 50 ton capacity. All truck scales complete with structural steel weighbridge.

STONE, COAL, CINDER CRUSHERS

10 to 20 tons per hour capacity $395.00
25 to 50 tons per hour capacity 945.00

More than 2000 mines and quarries have Bonded equipment.

BONDED SCALE & MACHINE CO.
128 Bellview Ave. Columbus 7, Ohio
Ph. Garfield 2186, Univ. 2832, Eves.

100,000 BTU PORTABLE
HEATER and DRYER

Stewart-Warner portable, powerful 100,000 BTU gasoline-burning Heaters, with Turbine type blowers; 1½ hp. air-cooled, ball-bearing engine; 8 ducts 145-ft. total. IMMEDIATE DELIVERY. Gov't. Cost $580

SALE PRICE $195.00

Excellent Operating Condition **Guaranteed**

HEATING buildings, shops, sheds, barns, warehouses, tunnels, bldgs. under construction, spot-heating, etc.

DRYING plaster, paint, grains, mortar, concrete. Torrid blasts of heat.

PRE-HEATING engines, tractors, trucks, equipment etc.

THAWING frozen areas, machinery, pipelines, tanks, etc.

- VAST QUANTITY OF REPLACEMENT PARTS
- Also SERVICE MANUAL & PARTS CATALOG

PHONE COLLECT—your Heater can be shipped within 2 hours, or, **SEND FOR LITERATURE.**

BERNSTEIN BROS.
MACHINERY CORPORATION
Phone 8404 • "Since 1890" • PUEBLO, COLO.

FOR SALE

1—B & W coal pulverizer
1—American pulverizer with 125 HP motor
1—Jeffrey hammer mill 24"x30"
Electric motors AC
Link Belt pan conveyors 36'x 22' centers
Richardson automatic scales
1—Fuller-Kinyon rotary compressor
Fuller-Kinyon pump (6")
6'x50' Manitowac dryer
Steel tanks
Fuller clinker cooling equipment for 10' kiln
Schmidth tube mill 6'6"x20'

OLLIE E. LAWRENCE
P.O. Box 688 Quincy, Mich.

Industrial Brown Hoist 20 ton locomotive crane, Type DA complete with controller and generator for magnet operation, an eight-wheel carrier Waukesha 6 cylinder Model SRL, 109 H.P., motor completely rebuilt 1947.

1—HENDRIX ⅜ yard Type TS Dragline Bucket, new
1—OWEN 1¼ yard Type K Clamshell Bucket
1—WILLIAMS ⅜ yard MF Multiple Rope Clamshell Bucket
1—WILLIAMS 1 yard MF Multiple Rope Clamshell Bucket
5—⅜ yard QUICKWAY Dragline Buckets, new
1—CEMCO 24"x40' portable conveyor, gas power, new and unused. (Bargain)
1—CMC Roll-O Hoist, new
1—ROSS one-way Model R2-22XL Snow Plow
2—PETTIBONE-MULLIKEN ⅜ yard Shovel Dippers with padlock, new
1—SULLIVAN 105' Portable Air Compressor, new
1—SULLIVAN 105' Air Compressor with Diesy Power Takeoff, no power
1—PSEC HYDRO MODEL LH 9 9' Road Planner with Westinghouse Compressor and Governor, new.

WRITE, WIRE OR PHONE

T. E. POTTS EQUIPMENT CO., INC.
2260 Sheridan Drive Buffalo 17, N. Y.
Phone: Delaware 2260

Small rock crushing plant as a unit or as individual items consisting of:

13x24 Telsmith Jaw Crusher (new bearings and seals)	36 foot bucket elevator
12x16 Eagle pulverizer used as secondary (new liners)	1 Case LAE engine
36x16 feet revolving screen	1 International PK40 engine

This plant is now running and will be replaced with a larger unit. Name your price.

H. S. CATRON
Junction City, Ky. Phone 2641

CRUSHERS, ETC.

1—Pair Rolls, Allis-Chalmers 40"x 15", Anaconda, rebuilt and Rebabbited.
1—No. 6 Traylor Gyratory Crusher with T.Z. head.
1—No. 4½ Traylor Gyr. Crusher.
1—No. 5 Champion Jaw Crusher 11"x26".
1—4'x5' Tyler Hummer D. Deck Vibrating screen.
1—18" Link-Belt Apron Conveyor—9" pitch, 27' centers, like new.
Bucket Elevators, open and totally enclosed, new and used, as is or rebuilt.

JOHNSON & HOEHLER, INC.
P.O. Box 102 Lansdowne, Pa.

FOR SALE

1—Traylor Gyratory Crusher—Type TY—18" with extra set of mantles.

VERY GOOD CONDITION
BATTLE CREEK CONCRETE PRODUCTS CO.
Battle Creek, Michigan

WHIRLEY CRANE

Colby Model 200 Electric Powered Whirley Crane 45 Ton at 30 Foot Radius. Spare Parts. Excellent condition.

PACIFIC BRIDGE COMPANY
333 Kearny St. San Francisco, Calif.

FOR SALE

Two A-C 42"x16" Roll Crushers, w/unused spare wearing parts, $2250.00 each.
A-C 16" Gyratory w/complete unused set wearing parts, $7500.00.

SORENSEN EQUIPMENT COMPANY
7701 San Leandro St., Oakland 3, Calif.
Lockhaven 8-1974

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT CLASSIFIED ADVERTISING IN CONCRETE PRODUCTS SECTION

FOR SALE

SHOVEL CRANE and CLAMSHELL

1—BUCYRUS-ERIE Model 10B, Combination Shovel, Crane and Clamshell, Powered with a Buda Gasoline Engine. Excellent condition and ready to go to work.

FURNIVAL MACHINERY CO.
54th & Lancaster Ave., Phila. 31, Pa.

FOR SALE OR RENT

1—¾ yd. Koehring 304 Crane
1—80-D Northwest Diesel Shovel and Crane
1—1¾ yd. Manitowoc 3000-A Shovel and Dragline
2—10 ton American Terry all steel stiff-leg Derricks
1—25 ton Industrial Diesel Locomotive Crane, 1942.
1—30 ton Plymouth Std. Ga. Gasoline Loco, 1943.
1—45 ton Plymouth Diesel Elec. Loco.
1—44 Ton G.E. Diesel Elec. Loco.

B. M. WEISS COMPANY
Girard Trust Co. Bldg.
Philadelphia 2, Pa. Rittenhouse 6-2311

FOR SALE

3-Buda Diesel complete power plants, 1-Caterpillar Power Plant, 2-Twin General Motors Diesel Engines, new, 1-Single Diesel Engine, new.

HARTLAND SAND & GRAVEL CO.
Hartland, Wis. Tel. 511

USE THE CLASSIFIED COLUMNS OF CONCRETE PRODUCTS TO REACH 23,243 PROSPECTS FOR YOUR USED EQUIPMENT.

EQUIPMENT WANTED

WANTED

Elevator Scale, Bulk Cement and Aggregate Bins for Complete Ready-Mix Concrete Plant. Reply

P.O. BOX 535 Port Huron, Mich.

WANTED

20 to 40 cu. yd. steel hopper; skid, wheel or crawler mounted; heavy duty to withstand 2½ cu. yd. dragline loading with boulders up to 12".

J. L. SHIELY COMPANY, INC.
1101 Snelling Ave. North
Saint Paul 4, Minn.

WANTED

2—Euclid 15-ton late model End Dump Trucks.

THE WALLACE STONE COMPANY
Bay Port, Michigan

CORE DRILLING

CORE DRILLING —anywhere!

"We look into the earth"

PENNSYLVANIA DRILLING COMPANY
Pittsburgh 20, Pa.

POSITIONS WANTED

Position Wanted: By graduate Chemical Engineer in the Portland Cement, Lime or Gypsum Industry. 11 years experience in Portland Cement manufacturing in research and supervising operations. In early thirties, married. Location immaterial. Now employed. Box II-94, c/o Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

A Quarry Production Manager and Supt. with years of commercial quarry experience seeks an operation where his know how can be utilized and remunerated accordingly. Perfect health, 48 yrs. married, C. E. degree—presently operating large scale limestone quarry. Box I-12, Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

BUSINESS OPPORTUNITIES

FOR SALE

As a going concern in Northern Ireland. Modern Agricultural Limestone Plant. Mill and Stores covering 1,850 sq. yds. on freehold site. Unlimited supply of pure white limestone. Staffed with experienced and reliable workers, supervisors and Office staff. Present output 40,000 tons per year with constanly expanding market. For further particulars apply to Hazlett & Speirs, Ltd., Carmean Limestone Mills, Moneymore, Co. Derry, Northern Ireland. This plant would be a profitable investment at the present low rate of exchange. Northern Ireland is a Province with its own strong Conservative Government, providing the best conditions for Private Enterprise.

FOR SALE
COMPLETELY EQUIPPED SAND & GRAVEL PLANT

In full operation, 150,000 tons capacity. Established 30 years. Located in Midwest city serving 175,000. Convenient to miles of new highway projects. Practically unlimited supply of road and construction material. Owner retiring after 30 years of successful operation.

Box I-21, c/o Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

Firm building cement-works equipment in France would buy license for making bagging machines.

ETS. DAVIDSEN
64 rue La Boetie Paris 8me

POSITIONS VACANT

Gravel mining superintendent strip and mill; 3,000 tons per day operation. Must have successful technical, administrative and cost record. Production planning and result primary requisite. Location Midwest. State complete details. Box I-14, Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

WANTED for permanent position, an experienced superintending Engineer for a Cement Plant in South America, situated in temperate climate, large capacity.

Box I-18, Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

Assistant Plant Engineer Wanted: Ohio location; stone and lime producer; prefer mechanical engineer with 2 to 10 years experience; 28 to 40 age range. Fair salary and excellent future possibilities in engineering and operating fields. Furnish complete data for personal interview. Box I-15, Rock Products, 309 W. Jackson Blvd., Chicago 6, Ill.

Industrial Sand Plant Supt. Midwest district. Good advancement opportunities. Give birthplace and date, education, equipment knowledge, past experience, salary expected, together with other pertinent facts. Write Box I-10, Rock Products, 309 W. Jackson Blvd., Chicago 6, Illinois.

CONSULTING ENGINEERS

J. C. WITT
CONSULTING ENGINEER CHICAGO

5854 Stony Island Avenue

"—from Raw Materials Deposits to Concrete in Place."

PLANT DESIGN, PLANT OPERATION, EXPERIMENTAL ENGINEERING, RESEARCH.
Inventor of the Counter-Cyclone Clinkerer

HERBERT H. LAUER, E.M.

Mem. Am. Soc. Mech. Engrs.
Mem. Am. Inst. Mining Engrs.
CONSULTING ENGINEER
CEMENT and INDUSTRIAL PLANTS
Room 1436-1437 Land Title Bldg.
Broad & Chestnut Sts., Philadelphia, Pa.

CUT YOUR LIME PRODUCTION COSTS!

If you are operating rotary kilns, it's 10 to 1 you can reduce your lime production costs—as much as 40%. We determine the actual savings possible by proved, scientific methods. Details on procedure gladly furnished—no obligation. Delay costs you money. Write today.

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Consulting Engineering Service
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E. LEE HEIDENREICH JR.

Consulting Engineers
67 Second Street, Newburgh, N. Y.
Phone 1828

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

Operation
Plant Layout
Design
Appraisals
Construction

INDEX TO DISPLAY ADVERTISERS

INDEX TO CLASSIFIED ADVERTISERS

ALSO SEE INDEX OF CONCRETE PRODUCTS SECTION ADVERTISERS ON PAGE 234

LORAIN 50 SERIES . . *The First Machine in the 1 Yard Class with Hydraulic-Coupling*

Yes, on the new Lorain-50 the hydraulic coupling (fluid clutch) power-take-off is standard equipment, at no extra cost! — In operation this means (1) the engine can't be stalled under any digging conditions; (2) digging impacts and stresses are absorbed before they reach the operating mechanism . . . And the Lorain-50 brings you many other NEW features, in addition to those shown . . . Your Thew-Lorain distributor has the complete story ready for you — today!

THE THEW SHOVEL CO., LORAIN, OHIO

It's the LORAIN 50 for 1950

MORE FOR YOUR MONEY IN A LORAIN

THEW LORAIN®

LORAIN 50 SERIES

SHOVELS • CRANES • CLAMSHELLS • DRAGLINES
HOES • MOTO-CRANES

ROCK PRODUCTS

DIRECTORY OF MANUFACTURERS' EQUIPMENT

1950

Machinery, equipment and supplies for the Rock Products' Industries are listed alphabetically and the names and addresses of manufacturers indicated.

Advertisers in this issue of ROCK PRODUCTS are identified by a dot (•) preceding the listing. Turn to Advertiser Index for the page number.

Numbers under manufacturers listings identify subdivision in which their equipment falls. See beginning of each classification for code identification.

A

ABRASIVES

AMERICAN WHEELABRATOR & EQUIP. CORP., 439 S. Byrkit St., Mishawaka, Ind.

THE CARBORUNDUM CO., REFRACTORIES DIV., Perth Amboy, N. J.

PANGBORN CORP., Hagerstown, Md.

STONE MACHINERY CO., INC., 399 Fayette St., Manlius, N. Y.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

ADMIXTURES, Aggregate

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.

A. C. HORN CO., INC., 10th St. & 44th Ave., Long Island City 1, N. Y.

MINNESOTA MINING & MFG. CO., 900 Fauquier Ave., St. Paul 6, Minn.

QUIGLEY COMPANY, INC., 527 Fifth Ave., New York 17, N. Y.

REARDON INDUSTRIES INC., 2837 Stanton Ave., Cincinnati 6, Ohio

SIKA CHEMICAL CORP., 35 Gregory Ave., Passaic, N. J.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

TAMMS INDUSTRIES, INC., 228 No. LaSalle St., Chicago 1, Ill.

AERATION UNIT, for Blending Agitation in Bins

THE BIN-DICATOR CO., 13946 Kercheval Ave., Detroit 15, Mich.

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

AERIAL TRAMWAYS

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

INTERSTATE EQUIPMENT DIV., YARA ENGINEERING CORP., 18 W. Jersey St., Elizabeth 4, N. J.

AFTERCOOLERS, Air

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

AGGREGATES, for Concrete, Lightweight Slag, Haydite, etc.

ALEXITE ENG. DIV., ALEXANDER FILM CO., Alexander Film Bldg., Colorado Springs, Colo.

AMERICAN VERMICULITE CORP., 654 Madison Ave., New York 21, N. Y.

THE CARTER-WATERS CORP., 2440 Pennway, Kansas City 8, Mo.

CELOTEX CORP., 120 S. LaSalle St., Chicago 3, Ill.

THE MARIETTA CONCRETE CORP., Westview, Box 356, Marietta, Ohio

H. HESSEY MILLER, Delaware Ave. & Flower St., Chester, Pa.

PUMICE AGGREGATE SALES CORP., 121 S. Yale Ave., Albuquerque, New Mex.

PUMICE ENGINEERING CO., Bend, Oregon

QUIGLEY COMPANY, INC., 527 Fifth Ave., New York 17, N. Y.

UNIVERSAL-ZONOLITE CO., 135 So. LaSalle St., Chicago 3, Ill.

THE WAYLITE COMPANY, 105 W. Madison St., Chicago 2, Ill.

AGITATORS (see Vibrators, Portable Concrete)

AGITATORS, Slurry (see Slurry Agitators)

AIR COMPRESSORS

1. Portable
2. Stationary

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wisc.
1—2

AMERICAN BRAKE SHOE CO., KELLOGG DIV., 97 Humboldt St., Rochester 9, N. Y.
1—2

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
2

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.
1—2

CONSTRUCTION PRODUCTS CORP., 410 San Fernando Road, Los Angeles 31, Calif.
2

CURTIS PNEUMATIC MACHINERY CO., 1988 Kienlen Ave., St. Louis 20, Mo.
2

DAVEY COMPRESSOR CO., N. Water & Saginor Sts., Kent, Ohio
1—2

THE DeVILBISS CO., 300 Phillips Ave., Toledo 1, Ohio
1—2

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.
2

GARDNER-DENVER CO., Quincy, Ill.
1—2

GRAY COMPANY, INC., 60 Eleventh Ave., N. E., Minneapolis 13, Minn.
2

HOBART BROTHERS CO., Hobart Square, Troy, Ohio
2

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.
1—2

•**THE JAEGER MACHINE CO.,** 550 W. Spring St., Columbus 16, Ohio
1—2

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.
1—2

LEROI CO., 1706 So. 68th St., Milwaukee, Wis.

LYNCH CORP., 3600 Summit St., Toledo 1, Ohio
1—2

O. K. CLUTCH & MCHNRY. CO., Florence St., Columbia, Pa.
1

QUINCY COMPRESSOR CO., 217 Maine St., Quincy, Ill.
1—2

SCHRAMM INC., West Chester, Pa.
1—2

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
1—2

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.
1—2

AIR CONDITIONING EQUIPMENT, Laboratory

BUFFALO FORGE CO., 490 Broadway, Buffalo 5, N. Y.

CLARAGE FAN CO., 619 Porter St., Kalamazoo 16, Mich.

CURTIS PNEUMATIC MACHINERY CO., 1988 Kienlen Ave., St. Louis 20, Mo.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

AIR CONVEYORS (see Conveyors Air)

AIR ENTRAINING AGENTS

AUTOLENE LUBRICANTS CO., INDUSTRIAL & RESEARCH DIV., 1331 West Evans, Denver 9, Colo.

DEWEY AND ALMY CHEMICAL CO., 62 Whittemore Ave., Cambridge 40, Mass.

•**THE MASTER BUILDERS CO.,** 7016 Euclid Ave., Cleveland 3, Ohio

E. L. MOORE CO., 1931 Oakwood St., Pasadena 7, Calif.

NEWPORT INDUSTRIES, INC., 230 Park Ave., New York 17, N. Y.

NOPCO CHEMICAL CO., First and Essex Sts., Harrison, N. J.

SIKA CHEMICAL CORP., 35 Gregory Ave., Passaic, N. J.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

SPRAY - O - BOND COMPANY, 2225 N. Humboldt Ave., Milwaukee 12, Wisc.

AIR FILTERS

AMERICAN AIR FILTER CO., INC., 215 Central Ave., Louisville 8, Ky.

THE DeVILBISS CO., 300 Phillips Ave., Toledo 1, Ohio

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

LINCOLN ENGINEERING CO., 5701 Natural Bridge, St. Louis 20, Mo.

AIR HEATERS

•**THE BABCOCK & WILCOX CO.,** 85 Liberty St., New York 6, N. Y.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

AIR LINE LUBRICATORS

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.

GARDNER-DENVER CO., Quincy, Ill.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

KNOX MFG. CO., 226 W. Clinton Ave., Oaklyn, N. J.

LINCOLN ENGINEERING CO., 5701 Natural Bridge, St. Louis 20, Mo.

•**NEW HAVEN VIBRATOR CO.,** 131 Chestnut St., New Haven 7, Conn.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

AIR RECEIVERS, Tanks, Steel

CURTIS PNEUMATIC MACHINERY CO., 1988 Kienlen Ave., St. Louis 20, Mo.

GARDNER-DENVER CO., Quincy, Ill.

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg., Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wisc.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

AIR SEPARATORS

ABBE ENGINEERING CO., 50 Church St., New York 7, N. Y.

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wisc.

THE DeVILBISS CO., 300 Phillips Ave., Toledo 1, Ohio

•**HARDINGE CO., INC.,** 240 Arch St., York, Pa.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

•**RAYMOND PULVERIZER DIV., COMBUSTION ENG. CO., INC.,** 1315 N. Branch St., Chicago 22, Ill.

SEPARATIONS ENGINEERING CO., 110 E. 42nd St., New York 17, N. Y.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

•**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.

•**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.

AIR TRANSPORT SYSTEMS (see Conveyors Air)

ALLOYS

1. **Abrasion Resisting**
2. **Heat Resisting**
3. **Manganese**

ALLIED STEEL PRODUCTS, INC., 7835 Broadway, Cleveland 5, Ohio
1—3

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.
1—3—

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.
1—2—3

•**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.
1—2—3

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.
1—2—3

CHICAGO STEEL FOUNDRY CO., 3720 So. Kedzie Ave., Chicago 32, Ill.
1—2

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Oreg.
1—2—3

ELECTRO-ALLOYS DIV., AMERICAN BRAKE SHOE CO., Taylor St. & Abbey Road, Elyria, Ohio
1—2

THE FAHRALLOY CO., 149th Loomis St., Harvey, Ill.
1—2

FARRELL-CHEEK STEEL CO., Sandusky, Ohio
1—

•**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.
1—3

INTERNATIONAL NICKEL CO., 67 Wall St., New York 5, N. Y.
1

JONES & LAUGHLIN STEEL CORP., Third Ave. & Ross St., Pittsburgh 30, Pa.
1

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.
1

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.
1—3

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.
1—3

•**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.
1—2—3

•**STOODY COMPANY,** Whittier, Calif.
1—2—3

STROH PROCESS STEEL CO., 1428 High St., Pittsburgh 12, Pa.
1

•**STULZ-SICKLES CO.,** 134 Lafayette St., Newark 5, N. J.
3

•**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.
1—3

WALL COLMONOY CORP., 19345 John R. St., Detroit 3, Mich.
1—2

ALTERNATORS, Electric

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wisc.

CROCKER-WHEELER ELECTRIC MFG. CO., DIV. OF ELLIOTT CO., Ampere, N. J.

ELECTRIC MACHINERY MFG. CO., 1331 Tyler St. N.E., Minneapolis 13, Minn.

INTERNATIONAL DIESEL ELECTRIC CO., INC., 13-02 44th Ave., Long Island City 1, N. Y.

KATO ENGINEERING CO., 108 Maxfield St., Mankato, Minn.

AMMETERS, Electric

THE BRISTOL CO., Waterbury 20, Conn.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

WHEELCO INSTRUMENTS CO., 847 W. Harrison St., Chicago 7, Ill.

ANTI-FRICTION BEARINGS (see Bearings)

APRON FEEDERS (see Feeders, Apron)

ARC WELDING APPARATUS (see Welding Machines, Arc)

ASPHALT MIXING PLANTS

BARBER-GREENE CO., 631 W. Park Ave., Aurora, Ill.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

HETHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

•**IOWA MFG. CO.,** 916-16th St. N.E., Cedar Rapids, Iowa

•**THE JAEGER MACHINE CO.,** 550 W. Spring St., Columbus 16, Ohio

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

•**PETTIBONE MULLIKEN CORP.,** 4710 W. Division St., Chicago 51, Ill.

•**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

SIMPLICITY SYSTEM CO., Riverside Dr., Chattanooga 6, Tenn.

AUTOCLAVES, Laboratory

AMERICAN INSTRUMENT CO., INC., Silver Spring, Md.

•**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.

AXLES & WHEELS, Car & Locomotive

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.

THE CHASE FOUNDRY & MFG. CO., 2300 S. Parsons Ave., Columbus 7, Ohio

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.

EATON MANUFACTURING CO., 739 E. 140 St., Cleveland 10, Ohio

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

B

BABBITT METAL (see Bearing Metals)

BAG CLEANERS

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wisc.

•**MULTIPLEX MACHINERY CORP.,** Elmore, Ohio

THE NORTHERN BLOWER CO., 6408 Barberton Ave., Cleveland 2, Ohio

BAGGING MACHINES

•**BEMIS BRO. BAG CO.,** 408 Pine St., St. Louis 2, Mo.

INTERNATIONAL PAPER CO., BAGPAK DIV., 220 E. 42nd St., New York 17, N. Y.

•**ST. REGIS SALES CORP.,** 230 Park Ave., New York 17, N. Y.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

BAGS, Dust Collector

AMERICAN WHEELABRATOR & EQUIP. CORP., 439 S. Byrkit St., Mishawaka, Ind.

THE NORTHERN BLOWER CO., 6408 Barberton Ave., Cleveland 2, Ohio

BAGS

1. **Paper**
2. **Cloth**

•**BEMIS BRO. BAG CO.,** 408 Pine St., St. Louis 2, Mo.
1—2

CHASE BAG CO., 309 W. Jackson Blvd., Chicago 6, Ill.
1—2

EQUITABLE PAPER BAG CO., 47-00 31st Place, Long Island City, N. Y.
1

FULTON BAG & COTTON MILLS, P. O. Box 1726, Atlanta 1, Ga.
1—2

HAMMOND BAG & PAPER CO., Lobmiller Blvd., Wellsburg, W.Va.
1

INTERNATIONAL PAPER CO., BAGPAK DIV., 220 E. 42nd St., New York 17, N. Y.
1

JAITE COMPANY, Jaite, Ohio
1

•**KRAFT BAG CORP.,** 630 Fifth Ave., New York 20, N. Y.
1

THE RAYMOND BAG CO., Tytus Ave. & Enoch Dr., Middletown, Ohio
1

•**ST. REGIS SALES CORP.,** 230 Park Ave., New York 17, N. Y.
1

SECURITY BAG CO., 96 Clifton Pl., Brooklyn 5, N. Y.
1—2

•**UNION BAG AND PAPER CORP.,** 233 Broadway (Woolworth Bldg.) New York 7, N. Y.
1

BAG TIES, Wire

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

•**BEMIS BRO. BAG CO.,** 408 Pine St., St. Louis 2, Mo.

CHASE BAG CO., 309 W. Jackson Blvd., Chicago 6, Ill.

SECURITY BAG CO., 96 Clifton Pl., Brooklyn 5, N. Y.

BALL BEARINGS, (see Bearings, Ball)

BALL MILLS (see Mills, Ball)

BALLS & SLUGS, Grinding, (see Grinding Media)

BARGES, Sand and Gravel, etc.

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.

•**EAGLE IRON WORKS,** 137 Hotcomb Ave., Des Moines 4, Iowa

MANITOWOC ENGINEERING WORKS, Manitowoc, Wisc.

•**MAXON CONSTRUCTION CO., INC.,** 131 N. Ludlow St., Dayton 2, Ohio

MILLVILLE IRON WORKS, INC., 6th St. & Florence Ave., Millville, N. J.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

BATCHERS, BIN

1. Weighing
2. Volumetric

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
1

AUTOMATIC LIQUID METER CO., 1372-1378 E. 15th St., Los Angeles 21, Calif.
2

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio
1

•**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.
1—2

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wisc.
2

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.
1

BUILDERS - PROVIDENCE, INC., 9 Codding St., Providence 1, R. I.
1—2

•**BUTLER BIN CO.,** Box 407, Waukesha, Wisc.
1—2

JOHN CHATILLON & SONS, 85 to 93 Cliff St., New York 7, N. Y.
1

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa
1—2

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.
1—2

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga.
2

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.
1—2

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.
1—2

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.
1—2

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio
1

•**IOWA MFG. CO.,** 916-16th St., N.E., Cedar Rapids, Iowa
1—2

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
1

•**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.
1

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.
1

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.
1

MEYER SCALES, INC., 449 Central Ave., Orange, N. J.
1

MIXERMOBILE MANUFACTURERS, 6855 N.E. Halsey St., P. O. Box 5108, Portland 16, Ore.
1

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.
1

OMEGA MACHINE CO., P. O. Box 1342, Providence 1, R. I.
1—2

•**RICHARDSON SCALE CO.,** Van Houton Ave., Clifton, N. J.
1

SCHAFFER POIDOMETER CO., 2828 Smallman St., Pittsburgh 22, Pa.
1—2

SCIENTIFIC CONCRETE SERVICE CORP., 724 Salem Ave., Elizabeth 3, N. J.
1

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
1

STREETER-AMET CO., 4101 N. Ravenswood, Chicago 18, Ill.
1

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.
1—2

TOLEDO SCALE CO., 1090 Telegraph Road, Toledo 12, Ohio
1—2

WILLARD CONCRETE MACHINERY CO., LTD., 2906 Imperial Highway, Lynwood, Calif.
1

WINSLOW GOVT. STANDARD SCALE CO., 25th & Hawthorne, Terre Haute, Ind.
1—2

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.
1—2

BATCHING PLANTS

•**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**BUTLER BIN CO.,** Box 407, Waukesha, Wisc.

•**CONCRETE TRANSPORT MIXER CO.,** 4985 Fyler Ave., St. Louis, Mo.

CONSTRUCTION MACHINERY COS., Glenwood & Vinton Sts., Waterloo, Iowa

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

BATTERIES, Storage

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

THE ELECTRIC STORAGE BATTERY CO., 19th St. & Allegheny Ave., Philadelphia 32, Pa.

BATTERY CHARGING EQUIPMENT

ALBERT & J. M. ANDERSON MFG. CO., 289-305 A St., Boston 10, Mass.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

THE ELECTRIC STORAGE BATTERY CO., 19th St. & Allegheny Ave., Philadelphia 32, Pa.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

HOBART BROTHERS CO., Hobart Square, Troy, Ohio

STERLING MACHINERY CORP., 411 Southwest Blvd., Kansas City 8, Mo.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

BEARING METALS

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.

CARBONITE METAL CO. INC., Box 305, Burlington, Wisc.

DODGE MANUFACTURING CORP., Mishawaka, Ind.

THE INGALLS IRON WORKS CO., P. O. Drawer 2632, Birmingham 2, Ala.

MAGNOLIA METAL CO., 18 W. Jersey St., Elizabeth 4, N. J.

NATIONAL BEARING DIV., AM. BRAKE SHOE CO., 4930 Manchester St., St. Louis 10, Mo.

•**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.

TEUSCHER PULLEY AND BELTING CO., 801 N. Second St., St. Louis 2, Mo.

UNITED AMERICAN METALS CORP., 200 Diamond St., Brooklyn 22, N. Y.

BEARINGS

1. Ball
2. Roller
3. Thrust

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
1—2—3

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.
1—2—3

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.
2

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.
1—2—3

DODGE MANUFACTURING CORP., Mishawaka, Ind.
1—2

THE FAFNIR BEARING CO., 37 Booth St., New Britain, Conn.
1—2—3

THE FEDERAL BEARINGS CO. INC., Poughkeepsie, N. Y.
1

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
3

•**LINK BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.
1—2—3

MARLIN-ROCKWELL CORP., 402 Chandler St., Jamestown, N. Y.
1—2—3

NEW DEPARTURE, DIV. GENERAL MOTORS CORP., Bristol, Conn.
1

NICE BALL BEARING CO., 30th & Hunting Park Ave., Philadelphia 40, Pa.
1—3

NORMA - HOFFMAN BEARINGS CO., Hamilton Ave., Stamford, Conn.
1

ROLLER BEARING CO. OF AMERICA, Whitehead Rd. & Trainer St., Trenton 3, N. J.
2

ROLLWAY BEARING CO., INC., 541 Seymour St., Syracuse 4, N. Y.
2—3

•**S K F INDUSTRIES, INC.,** Front St. & Erie Ave., Philadelphia, Pa.
1—3

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
1

•**THE TIMKEN ROLLER BEARING CO.,** 1835 Dueber Ave., S. W., Canton 6, Ohio.
2—3

TORRINGTON BEARING CO., Torrington, Conn.
1

BELT ALIGNERS

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

BELT CONVEYORS AND ACCESSORIES, (see Conveyors, Belt)

BELT CUTTERS

•**ARMSTRONG-BRAY & CO.,** 5364 Northwest Highway, Chicago 30, Ill.

CLIPPER BELT LACER CO., 974 Front Ave. N. W., Grand Rapids 2, Mich.

•**FLEXIBLE STEEL LACING CO.,** 4607 Lexington St., Chicago 44, Ill.

BELT FASTENERS AND LACING

•**ARMSTRONG-BRAY & CO.,** 5364 Northwest Highway, Chicago 30, Ill.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

THE BRISTOL CO., Waterbury 20, Conn.

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.

CLIPPER BELT LACER CO., 974 Front Ave., N. W., Grand Rapids 2, Mich.

CRESCENT BELT FASTENER CO., 480 Lexington Ave., New York 17, N. Y.

•**FLEXIBLE STEEL LACING CO.,** 4607 Lexington St., Chicago 44, Ill.

GREY-ROCK DIV., RAYBESTOS-MANHATTAN, INC., Manheim, Pa.

•**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

J. E. RHOADS & SONS, 35 North 6th St., Philadelphia 6, Pa.

W. O. & M. W. TALCOTT, INC., 91 Sabin St., Providence 1, R. I.

BELT PULLEYS, (see Pulleys, Conveyor, Etc.)

BELT TRIPPERS, (see Conveyor Belt Trippers)

BELTING, Chain

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

BELTING, Rubber

1. Conveyor
2. Bucket Elevator
3. Power Transmission

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
1—2—3

•**BOSTON WOVEN HOSE & RUBBER CO.,** P. O. Box 1071, Boston 3, Mass.
1—2—3

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.
1—2—3

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DIRECTORY

THE CINCINNATI RUBBER MFG. CO., Franklin Ave., Cincinnati 12, Ohio.
1—2—3

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.
1—2—3

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.
1—2—3

R. & J. DICK CO. INC., P. O. Box 388, Passaic, N. J.
1—2—3

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.
1—2—3

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.
3

GENERAL CONVEYOR & MFG CO. 3601 Salena St., St. Louis 18, Mo.
1—2—3

L. H. GILMER CO., DIV. OF UNITED STATES RUBBER CO., Tacony 35, Pa.
3

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.
1—2—3

•**B. F. GOODRICH CO.,** Akron 11, Ohio
1—2—3

•**THE GOODYEAR TIRE & RUBBER CO., INC.,** 1144 E. Market St., Akron 16, Ohio
1—2—3

•**GEORGE HAISS MFG. CO.,** Park Ave. & 143rd St., New York 51, N. Y.
1—2—3

HAMILTON RUBBER MFG. CORP., Mead St., Trenton 3, N. J.
1—2—3

•**HEWITT RUBBER DIV., HEWITT-ROBINS INC.,** 240 Kensington Ave., Buffalo 5, N. Y.
1—2—3

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
1

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.
1—2—3

QUAKER PACIFIC RUBBER CO., 598 Potero Ave., San Francisco 10, Calif.
1—2—3

QUAKER RUBBER CORP., Tacony & Comly Sts., Philadelphia 24, Pa.
1—2—3

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.
1—2—3

REPUBLIC RUBBER DIV., LEE RUBBER & TIRE CORP., Albert St., Youngstown 1, Ohio
1—2—3

W. A. RIDDELL CORP., Bucyrus, Ohio
1—2—3

TEUSCHER PULLEY AND BELTING CO., 801 N. Second St., St. Louis 2, Mo.
1—2—3

•**THERMOID COMPANY,** Trenton, N. J.
1—2—3

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.
1—2

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.
1—2

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.
1—2—3

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.
1—2

BELTING, V-Type

•**ALLIS - CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wisc.

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.

•**BOSTON WOVEN HOSE & RUBBER CO.,** P. O. Box 1071, Boston 3, Mass.

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

THE DAYTON RUBBER CO., Dayton 1, Ohio

R. & J. DICK CO., INC., P. O. Box 388, Passaic, N. J.

DODGE MANUFACTURING CORP., Mishawaka, Ind.

THE FIRESTONE TIRE & RUBBER CO., 1200 Firestone Pkway, Akron 17, Ohio

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

L. H. GILMER CO., DIV. OF UNITED STATES RUBBER CO., Tacony 35, Pa.

•**B. F. GOODRICH CO.,** Akron 11, Ohio

•**THE GOODYEAR TIRE & RUBBER CO., INC.,** 1144 E. Market St., Akron 16, Ohio

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

THE MEDART CO., 100 Potomac St. St. Louis 18, Mo.

PYOTT FOUNDRY & MACHINE CO., 328 N. Sangamon St., Chicago 7, Ill.

QUAKER PACIFIC RUBBER CO., 598 Potero Ave., San Francisco 10, Calif.

QUAKER RUBBER CORP., Tacony & Comly Sts., Philadelphia 24, Pa.

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.

REPUBLIC RUBBER DIV., LEE RUBBER & TIRE CORP., Albert St., Youngstown 1, Ohio

J. E. RHOADS & SONS, 35 North 6th St., Philadelphia 6, Pa.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

BELTING, Wire

THE CAMBRIDGE WIRE CLOTH CO., Good Will Road, Cambridge, Md.

•**THE COLORADO FUEL & IRON CORP.,** P. O. Box 1920, Denver 1, Colo.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

L. H. GILMER CO., DIV. OF UNITED STATES RUBBER CO., Tacony 35, Pa.

KORB-PETTIT WIRE FABRICS & IRON WORKS, INC., 1505-15 N. Mascher St., Philadelphia 22, Pa.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

BENDING ROLLS, Reinforcing Steel

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.

•**QUINN WIRE & IRON WORKS,** Boone, Iowa

BIN GATES

ALLEN - SHERMAN - HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa.

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass.

•**AUSTIN-WESTERN CO.,** Aurora, Ill.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**BUTLER BIN CO.,** Box 407, Waukesha, Wisc.

•**CHAIN BELT CO.,** 1600 N. Bruce St., Milwaukee 4, Wisc.

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

DIAMOND IRON WORKS, INC., 1728 2nd St., No., Minneapolis 11, Minn.

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

•**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

•**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.

McNALLY - PITTSBURG MFG. CORP., Pittsburg, Kans.

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

•**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

•**RICHARDSON SCALE CO.,** Van Houton Ave., Clifton, N. J.

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

•**SMITH ENGINEERING WORKS,** 508 E. Capitol Dr., Milwaukee 12, Wisc.

THE STANDARD METAL MFG. CO., Malinta, Ohio

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**UNIVERSAL ENGINEERING CORP.,** 625 C Ave., N. W., Cedar Rapids, Iowa

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

•**WITTEMANN MACHINERY CO.,** Paynters Road, Farmingdale, N. J.

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THE BIN-DICATOR CO., 13946 Kercheval Ave., Detroit 15, Mich.

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MOSHER ELECTRONIC CONTROLS, 130 W. 42nd St., New York 18, N. Y.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

SYNTRON CO., 405 Lexington Ave., Homer City, Pa.

BINS AND BATCHING EQUIPMENT

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio.

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass.

•**AUSTIN-WESTERN CO.,** Aurora, Ill.

•**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

L. BURMEISTER CO., 4535 W. Mitchell St., Milwaukee 14, Wisc.

•**BUTLER BIN CO.,** Box 407, Waukesha, Wisc.

CONSTRUCTION MACHINERY CO., Glenwood & Vinton Sts., Waterloo, Iowa

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

DRAVO CORP., ENGINEERING WKS. DIV., Neville Island, Pittsburgh 6, Pa.

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

•**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

IRVINGTON FORM & TANK CORP., 43 Cedar St., New York 5, N. Y.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

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DIRECTORY

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

MEYER SCALES, INC., 449 Central Ave., Orange, N. J.

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

●**RICHARDSON SCALE CO.,** Van Houton Ave., Clifton, N. J.

●**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

●**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.

●**WITTEMANN MACHINERY CO.,** Paynters Road, Farmingdale, N. J.

BINS, STORAGE: CONCRETE (MONOLITHIC)

●**CONCRETE TRANSPORT MIXER CO.,** 4985 Fyler Ave., St. Louis, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

IRVINGTON FORM & TANK CORP., 43 Cedar St., New York 5, N. Y.

●**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

NICHOLSON CO., 10 Rockefeller Plaza, New York 20, N. Y.

BIN, STORAGE: CONCRETE (PRECAST)

CONCRETE SILO CO., P. O. Box 346, Bloomfield, Ind.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

THE MARIETTA CONCRETE CORP., Westview, Box 356, Marietta, Ohio

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

NICHOLSON CO., 10 Rockefeller Plaza, New York 20, N. Y.

BINS, STORAGE: STEEL

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass.

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio

●**AUSTIN-WESTERN CO.,** Aurora, Ill.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

BIRMINGHAM TANK CO., DIV. OF INGALLS IRON WKS. CO., P. O. Drawer 1490, Birmingham 1, Ala.

●**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**BUTLER BIN CO.,** Box 407, Waukesha, Wisc.

CONSTRUCTION MACHINERY CO.S., Glenwood & Vinton Sts., Waterloo, Iowa

●**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

●**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

DIAMOND IRON WORKS, INC., 1728 2nd St., No., Minneapolis 11, Minn.

DRAVO CORP., ENGINEERING WKS. DIV., Neville Island, Pittsbugh 6, Pa.

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg., Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**GRUENDLER CRUSHER & PULVERIZER CO.,** 2920 N. Market St., St. Louis 6, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

●**ROBINS CONVEYORS DIV., HEWITT- ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

ROBERT HOLMES & BROS., INC. 3519 Junction Ave., Danville, Ill.

●**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa.

IRVINGTON FORM & TANK CORP., 43 Cedar St., New York 5, N. Y.

●**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

●**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wisc.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

McDERMOTT BROS. CO., Ft. of Washington St., Allentown, Pa.

McNALLY - PITTSBURG MFG. CORP., Pittsburg, Kans.

●**NEW HOLLAND MFG. CO.,** Mountville, Pa.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

●**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1, Ohio

●**RICHARDSON SCALE CO.,** Van Houton Ave., Clifton, N. J.

●**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

●**UNIVERSAL ENGINEERING CORP.,** 625 C Ave., N. W., Cedar Rapids, Iowa

●**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.

●**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.

BITS, Carbide Drill

CARBOLOY CO., INC., 11177 E. Eight Mile Rd., Detroit 32, Mich.

GARDNER-DENVER CO., Quincy, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

●**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

KENNAMETAL INC., Latrobe, Pa.

●**ROCK BIT SALES & SERVICE CO.,** 2514 E. Cumberland St., Philadelphia 25, Pa.

SALEM TOOL CO., 700 S. Ellsworth St., Salem, Ohio

●**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

BITS, Drill

CARBOLOY CO., INC., 11177 E. Eight Mile Rd., Detroit 32, Mich.

GARDNER-DENVER CO., Quincy, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

●**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

THE LOOMIS MACHINE CO., 15 E. Market St., Tiffin, Ohio

●**ROCK BIT SALES & SERVICE CO.,** 2514 E. Cumberland St., Philadelphia 25, Pa.

SALEM TOOL CO., 700 S. Ellsworth St., Salem, Ohio

THE SANDERSON CYCLONE DRILL CO., 157 S. Main St., Orrville, Ohio

SCHRAMM INC., West Chester, Pa.

STAR DRILLING MACHINE CO., 474 Washington St., Akron 11, Ohio

●**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

●**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

BITS, Drill, Detachable

GARDNER-DENVER CO., Quincy, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

●**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

KENNAMETAL INC., Latrobe, Pa.

●**ROCK BIT SALES & SERVICE CO.,** 2514 E. Cumberland St., Philadelphia 25, Pa.

SALEM TOOL CO., 700 S. Ellsworth St., Salem, Ohio

SCHRAMM INC., West Chester, Pa.

●**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

●**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

BITS, Drill, Grinders

CARBOLOY CO., INC., 11177 E. Eight Mile Rd., Detroit 32, Mich.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

●**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh, 22, Pa.

THE MINE & SMELTER SUPPLY CO., 1422 17th St., Denver 17, Colo.

SCHRAMM INC., West Chester, Pa.

●**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

BLACKSMITH TOOLS

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

THE LOOMIS MACHINE CO., 15 E. Market St., Tiffin, Ohio

BLASTING MACHINES

●**AMERICAN CYANAMID CO.,** Explosives Dept., 30 Rockefeller Plaza, New York 20, N. Y.

AMERICAN WHEELABRATOR & EQUIP. CORP., 439 S. Byrkit St., Mishawaka, Ind.

●**E. I. du PONT de NEMOURS & CO., INC.,** Wilmington, Del.

HERCULES POWDER CO., 946 King St., Wilmington, Del.

ILLINOIS POWDER MFG. CO., 730 Pierce Bldg., St. Louis 2, Mo.

THE KING POWDER CO., INC., P. O. Box 974, Cincinnati 1, Ohio

THE MACLEOD CO., 2232-40 Bogen St., Cincinnati 22, Ohio

SALEM TOOL CO., 700 S. Ellsworth St., Salem, Ohio

BLASTING SUPPLIES

●**AMERICAN CYANAMID CO.,** Explosives Dept., 30 Rockefeller Plaza, New York 20, N. Y.

●**ATLAS POWDER CO.,** Delaware Trust Bldg., Wilmington, Del.

●**E. I. du PONT de NEMOURS & CO., INC.,** Wilmington 98, Del.

ENSIGN BICKFORD CO., Simsbury, Conn.

THE EQUITABLE POWDER MFG. CO., East Alton, Ill.

HERCULES POWDER CO., 946 King St., Wilmington, Del.

ILLINOIS POWDER MFG. CO., 730 Pierce Bldg., St. Louis 2, Mo.

THE KING POWDER CO., INC., P. O. Box 974, Cincinnati 1, Ohio

KORD-PETTIT WIRE FABRICS & IRON WORKS, INC., 1505-15 N. Mascher St., Philadelphia 22, Pa.

MILLER MANUFACTURING CO., Mills Bldg., P. O. Dr. 666, El Paso, Tex.

NATIONAL POWDER CO., Eldred, Pa.

TROJAN POWDER CO., 17 N. Seventh St., Allentown, Pa.

BLOCK MACHINES, Concrete Building

1. **Tamping**
2. **Vibrating**

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
1—2

J. W. APPLEY & SON, INC., 829-831 9th St., No., St. Petersburg, Fla.
2

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
2

●**BESSER MFG. CO.,** Alpena, Mich.
1—2

BURKHARD BLOCKS INC., 316 Broad St., Waverly, N. Y.
1

●**GEO. C. CHRISTOPHER & SON IRON WORKS CO.,** 1220 Blaine, Wichita 1, Kans.
1

COLLINS EQUIPMENT & SUPPLY CO., 19 E. Jefferson St., Joliet, Ill.
1—2

●**COLUMBIA MACHINE WORKS,** 105 Main St., Vancouver, Wash.
1—2

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga.
2

DES PLAINES CONCRETE PROD. MACHINERY, 930 North Ave., Des Plaines, Ill.
1—2

DOMINE AUTOMATIC MACHINE CO., 155-225 Gould St., Rochester, N. Y.
1

W. E. DUNN MFG. CO., 550 W. 23rd St., Holland, Mich.
2

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.
2

●**GENERAL ENGINES CO.,** 307 Hunter St., Gloucester, N. J.
2

F. C. GEORGE MACHINE CO., INC., 100 S. Westmoreland Dr., Orlando, Fla.
1—2

JACKSON & CHURCH CO., 321 N. Hamilton Ave., Saginaw, Mich.
1—2

●**THE KENT MACHINE CO.,** 1931 Thomas St., Cuyahoga Falls, Ohio
1—2

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DIRECTORY

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.
2

•**LITH-I-BAR CO.**, Holland, Mich.
1—2

THE MILES MFG. CO., P. O. Box 65, Jackson, Mich.
1

LESLIE C. MILLER SUPPLY INC., P. O. Box 7, Bedford, Ohio
1—2

MISHCO CORP., 615 S. W. 2nd Ave., Miami, Fla.
2

MORTARLESS TILE MACH. CO., INC., 2623 Riverside Dr., Los Angeles 39, Calif.
1—2

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio
1—2

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.
2

•**OSWALD ENGINEERING SERVICE CORP.**, 1335 Circle Ave., Forest Park, Ill.
1

•**PRASCHAK MACHINE CO.**, Marshfield, Wisc.
1—2

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.
1—2

•**STEARNS MFG. CO., INC.**, 600 E. Beecher St., Adrian, Mich.
1—2

SUPERIOR-LIDGERWOOD-MUNDY CORP., 7 Dey St., New York 7, N. Y.
1

H. R. SUTTER CO., 661 Wyoming Ave., Buffalo, N. Y.
1

TWINPLEX HYDRAULICS, INC., 2507 James St., Syracuse 6, N. Y.
2

UNIVERSAL TAMPERS INC., 1530 N. Adams St., Peoria 3, Ill.
1—2

•**VAN ORNUM CO.**, 344 Haddon Ave., Westmont, N. J.
2

•**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.
1

C. M. WOOTEN CO., 2721 N. Central Ave., Knoxville 17, Tenn.
1—2

BLOCKS, Pillow, Ball and Roller Bearing

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

R. & J. DICK CO., INC., P. O. Box 388, Passaic, N. J.

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.

DODGE MANUFACTURING CORP., Mishawaka, Ind.

•**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

THE FAFNIR BEARING CO., 37 Booth St., New Britain, Conn.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

THE MEDART CO., 100 Potomac St., St. Louis 18, Mo.

SPROUT, WALDRON & CO., INC., Muncy, Pa.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.

BLOCKS, REFRACTORY, (see Refractories)

BLOCKS, Sheave and Chain

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.

DOWNS CRANE & HOIST CO., 540 W. Vernon Ave., Los Angeles 37, Calif.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

MADESCO TACKLE BLOCK CO., P. O. Box 148, Easton, Pa.

•**SAUERMAN BROS., INC.**, 530 S. Clinton St., Chicago 7, Ill.

THE UPSON-WALTON CO., Perry Payne Bldg., Cleveland 13, Ohio

•**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

BLOWERS, (see Fans and Blowers)

BLOW TORCHES, Heaters, Thawing Outfits for Frozen Aggregates

DIAMOND IRON WORKS, INC., 1728 2nd St., No., Minneapolis 11, Minn.

THE MACLEOD CO., 2232-40 Bogen St., Cincinnati 22, Ohio

BOATS, Derrick, Tow

INGALLS SHIPBUILDING CORP., P. O. Drawer 2638, Birmingham 2, Ala.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wisc.

BOATS, Self-Unloading

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wisc.

•**SAUERMAN BROS., INC.**, 530 S. Clinton St., Chicago 7, Ill.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

BODIES, Ready Mixed Concrete

1. **Transit Mixed**
2. **Non-Agitator**

•**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.
1

•**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wisc.
1

•**CONCRETE TRANSPORT MIXER CO.**, 4985 Fyler Ave., St. Louis, Mo.
1

•**CONSERCO CO.**, River Road & B&O R. R., Washington, D. C.
1

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.
1

HERCULES STEEL PRODUCTS CORP., Sherman St., Galion, O.
2

•**THE JAEGER MACHINE CO.**, 550 W. Spring St., Columbus 16, O.
1

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.
1

•**MAXON CONSTRUCTION CO., INC.**, 131 N. Ludlow St., Dayton 2, Ohio
2

MIXERMOBILE MANUFACTURERS, 6855 N. E. Halsey St., P. O. Box 5108, Portland 16, Ore.
1

•**THE T. L. SMITH CO.**, 2835 N. 32nd St., Milwaukee 10, Wisc.
1

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.
1

BODIES, Detachable Concrete Truck

BROOKS EQUIPMENT & MFG. CO., 408-10 Davenport Road, Knoxville 3, Tenn.

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.

McCABE-POWERS AUTO BODY CO., 5900 N. Broadway, St. Louis 15, Mo.

BODIES, Dump, Dump Truck

ANTHONY COMPANY, Streator, Ill.

ATHEY PRODUCTS CO., 5631 W. 65th St., Chicago 38, Ill.

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

GALION ALL STEEL BODY CO., Galion, Ohio

GAR WOOD INDUSTRIES, INC., Wayne Div., Wayne, Mich.

THE HEIL CO., 3000 W. Montana St., Milwaukee 1, Wisc.

HERCULES STEEL PRODUCTS CORP., Sherman St., Galion, Ohio

KEWANEE MANUFACTURING CO., Department RP, Kewanee, Ill.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.

THE MARION METAL PRODUCTS CO., Cheney Ave. & Otis St., Marion, Ohio

McCABE-POWERS AUTO BODY CO., 5900 N. Broadway, St. Louis 15, Mo.

PERFECTION STEEL BODY CO., Galion, Ohio

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

TRUCK EQUIPMENT CO. INC., 1791 Fillmore Ave., Buffalo 14, N. Y.

WINCH-LIFT INC., 317 First National Bank, Shreveport, La.

BODIES, Trailer

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

FRUEHAUF TRAILER CO., 10940 Harper Ave., Detroit 32, Mich.

GALION ALL STEEL BODY CO., Galion, Ohio

GAR WOOD INDUSTRIES, INC., Wayne Div., Wayne, Mich.

HERCULES STEEL PRODUCTS CORP., Sherman St., Galion, O.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

BODIES, Trailer, Bulk Cement

THE MARION METAL PRODUCTS CO., Cheney Ave. & Otis St., Marion, Ohio

McCABE-POWERS AUTO BODY CO., 5900 N. Broadway, St. Louis 15, Mo.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

TRUCK EQUIPMENT CO. INC., 1791 Fillmore Ave., Buffalo 14, N. Y.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

WINCH-LIFT INC., 317 First National Bank, Shreveport, La.

L. BURMEISTER CO., 4535 W. Mitchell St., Milwaukee 14, Wis.

•**BUTLER BIN CO.**, Box 407, Waukesha, Wisc.

•**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

FRUEHAUF TRAILER CO., 10940 Harper Ave., Detroit 32, Mich.

HERCULES STEEL PRODUCTS CORP., Sherman St., Galion, O.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

WINCH-LIFT INC., 317 First National Bank, Shreveport, La.

BOILER ACCESSORIES

THE HAYS CORP., East 8th St., Michigan City, Ind.

•**JOSEPH T. RYERSON & SON, INC.**, 2558 West 16th St., Chicago 8, Ill.

BOILER FEED WATER SYSTEMS

CYCLOTHERM CORP., 157 East 1st St., Oswego, N. Y.

BOILER INSULATION

AMERICAN VERMICULITE CORP., 654 Madison Ave., New York 21, N. Y.

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

CHICAGO FIRE BRICK CO., 1467 Elston Ave., Chicago 22, Ill.

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

GENERAL REFRACTORIES CO., 1520 Locust St., Philadelphia 2, Pa.

A. P. GREEN FIRE BRICK CO., 1018 E. Breckenridge, Mexico, Mo.

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.

MEXICO REFRACTORIES CO., Better Refractories Bldg., Mexico, Mo.

QUIGLEY COMPANY, INC., 527 Fifth Ave., New York 17, N. Y.

BOILER TUBES

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1, Ohio

•**JOSEPH T. RYERSON & SON, INC.**, 2558 West 16th St., Chicago 8, Ill.

BOILERS

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

WM. BROS. BOILER & MFG. CO., 1057 10th Ave. S. E., Minneapolis 14, Minn.

CYCLOTHERM CORP., 157 East 1st St., Oswego, N. Y.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

MANITOWOC ENGINEERING WORKS, Manitowoc, Wisc.

WICKES BOILER CO., 519 N. Washington St., Saginaw, Mich.

BOILERS, Waste Heat

●**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

WM. BROS. BOILER & MFG. CO., 1057 10th Ave. S. E., Minneapolis 14, Minn.

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

WICKES BOILER CO., 519 N. Washington St., Saginaw, Mich.

BOOSTERS, Voltage, Motor Generator

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wisc.

●**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

BRAKE LINING

THE FIRESTONE TIRE & RUBBER CO., 1200 Firestone Pkway, Akron 17, Ohio

GREY-ROCK DIV., RAYBESTOS-MANHATTAN, INC., Manheim, Pa.

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.

THE RAYBESTOS DIV., RAYBESTOS-MANHATTAN, INC., Stratford, Conn.

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.

●**THERMOID COMPANY**, Trenton, N. J.

THE S. K. WELLMAN CO., 1374 E. 51st St., Cleveland 3, Ohio

BRAKES

1. **Clutch**
2. **Hydraulic**
3. **Magnetic**

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
3

●**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.
3

STEARNS MAGNETIC MFG. CO., 675 S. 28th St., Milwaukee 4, Wisc.
3

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.
3

BRICK, Refractory, Fire, (see Refractories)

BRICK MACHINES AND MOLDS

1. **Concrete**
2. **Sand-Lime**

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
1—2

●**BESSER MFG. CO.**, Alpena, Mich.
1—2

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga.
1—2

W. E. DUNN MFG. CO., 550 W. 23rd St., Holland, Mich.
1—2

●**GENERAL ENGINES CO.**, 307 Hunter St., Gloucester, N. J.
1

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.
2

LESLIE C. MILLER SUPPLY INC., P. O. Box 7, Bedford, Ohio
1

●**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio
1—2

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.
1

W. A. RIDDELL CORP., Bucyrus, Ohio
1—2

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.
1—2

●**STEARNS MFG. CO., INC.**, 600 E. Beecher St., Adrian, Mich.
1

●**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.
1—2

BUCKET LOADERS

●**AUSTIN-WESTERN CO.**, Aurora, Ill.

BARBER-GREENE CO., 631 W. Park Ave., Aurora, Ill.

EAGLE CRUSHER CO., INC., 900 Harding Way E., Galion, Ohio

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

MAINE STEEL INC., South Windham, Me.

MIXERMOBILE MANUFACTURERS, 6855 N. E. Halsey St., P. O. Box 5108, Portland 16, Ore.

N. P. NELSON IRON WORKS, INC., 820 Bloomfield Ave., Clifton, N. J.

OTTAWA STEEL PRODUCTS CO., Ottawa, Kansas

●**PETTIBONE MULLIKEN CORP.**, 4710 W. Division St., Chicago 51, Ill.

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.

TROWBRIDGE CONVEYOR CO., 651 Van Houten Ave., Clifton, N. J.

●**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

BUCKET LIPS & TEETH

ALLIED STEEL PRODUCTS, INC., 7835 Broadway, Cleveland 5, O.

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.**, 377 E. 14th St., Chicago Heights, Ill.

●**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

●**BUCYRUS-ERIE CO.**, South Milwaukee, Wisc.

CHICAGO STEEL FOUNDRY CO., 3720 So. Kedzie Ave., Chicago 32, Ill.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

FARRELL-CHEEK STEEL CO., Sandusky, Ohio

●**THE FROG, SWITCH & MFG. CO.**, Carlisle, Pa.

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

OWEN BUCKET CO., 6001 Breakwater Ave., Cleveland 2, Ohio

STROH PROCESS STEEL CO., 1428 High St., Pittsburgh 12, Pa.

●**TAYLOR-WHARTON IRON & STEEL CO.**, High Bridge, N. J.

●**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

BUCKETS

1. **Clamshell & Orange Peel**
2. **Dragline & Slackline**
3. **Dredge & Excavator**
4. **Elevator**
5. **Grapple**
6. **Skip**
7. **Tramway**
8. **Tractor Loader**

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.
4—7

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.**, 377 E. 14th St., Chicago Heights, Ill.
3—4

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.
3

●**AUSTIN-WESTERN CO.**, Aurora, Ill.
4

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio
4—6

BAY CITY SHOVELS, INC., Bay City, Mich.
4

●**BESSER MFG. CO.**, Alpena, Mich.
4

●**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.
1—2—3—5

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.
4

●**BUCYRUS-ERIE CO.**, South Milwaukee, Wisc.
1—2—3

●**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wisc.
4

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.
4

COYLE & ROTH, 3024 4th St. S. E., Minneapolis 14, Minn.
4

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.
4

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.
4—6

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.
1—2—3

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.
1—2—3—5

●**THE FROG, SWITCH & MFG. CO.**, Carlisle, Pa.
3

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.
6—7

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.
4

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.
1—2—3—4

●**THE HAYWARD CO.**, 202-204 Fulton St., New York, N. Y.
1—2—3—5

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio
4

HENDRIX MFG. CO., P. O. Box 31, Mansfield, La.
4

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.
4—6

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.
2

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.
2

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
4—6

●**THE C. S. JOHNSON CO.**, Subsidiary Koehring Co., Champaign, Ill.
1

FRANK A. KREMSER & SONS, INC., 3435-45 N. 5th St., Philadelphia 40, Pa.
8

LANDIS STEEL CO., 116 W. A St., Picher, Okla.
3—4

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.
4—5—6

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wisc.
4

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.
3

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.
3—4

M. P. McCAFFREY, INC., 2121 East 25th St., Los Angeles 11, Calif.
1—2—5

McDERMOTT BROS. CO., Ft. of Washington St., Allentown, Pa.
4

●**NEW HOLLAND MFG. CO.**, Mountville, Pa.
4

ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Ill.
1—5

OWEN BUCKET CO., 6001 Breakwater Ave., Cleveland 2, Ohio
1—3—5

PAGE ENGINEERING CO., Clearing P. O. Chicago 38, Ill.
2

●**PETTIBONE MULLIKEN CORP.**, 4710 W. Division St., Chicago 51, Ill.
1—2—3—4

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.
4—6—7

"QUICK-WAY" TRUCK SHOVEL CO., 4150 Josephine St., Denver 6, Colo.
8

●**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.
4—6—7

●**SAUERMAN BROS., INC.**, 530 S. Clinton St., Chicago 7, Ill.
2—6

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.
6

THE STANDARD METAL MFG. CO., Malinta, Ohio
4

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
4—6

SUPERIOR - LIDGERWOOD - MUNDY CORP., Superior, Wisc.
5

●**TAYLOR-WHARTON IRON & STEEL CO.**, High Bridge, N. J.
1—2—3—4—5—6—7

TRACKSON COMPANY, 333 S. Chase St., Milwaukee 1, Wisc.
8

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.
2—4

●**UNIVERSAL ROAD MACHINERY CO.**, 27 Emerick St., Kingston, N. Y.
4

●**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.
6

WAYNE CRANE DIV., AMERICAN STEEL DREDGE CO., INC., P. O. Box 570, Fort Wayne 1, Ind.
3

THE WELLMAN ENGINEERING CO., 7000 Central Ave., Cleveland 4, Ohio
2—4—5

●**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.
1—2

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

YAUN DRACLINE BUCKET CO., 2100 N. 3rd St., Baton Rouge, La.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

BUILDINGS, Industrial, all Steel

•**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

THE H. K. FERGUSON CO., Ferguson Building, Cleveland 14, O.

THE INGALLS IRON WORKS CO., P. O. Drawer 2632, Birmingham 2, Ala.

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1, Ohio

BULK CEMENT HANDLING EQUIPMENT

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

L. BURMEISTER CO., 4535 W. Mitchell St., Milwaukee 14, Wis.

•**BUTLER BIN CO.**, Box 407, Waukesha, Wisc.

•**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

•**FULLER COMPANY**, Fuller Bldg., Catasauqua, Pa.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

•**SAUERMAN BROS., INC.**, 530 S. Clinton St., Chicago 7, Ill.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

BULK CEMENT STORAGE PLANTS

•**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**BUTLER BIN CO.**, Box 407, Waukesha, Wisc.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

•**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

NICHOLSON CO., 10 Rockefeller Plaza, New York 20, N. Y.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

•**SAUERMAN BROS., INC.**, 530 S. Clinton St., Chicago 7, Ill.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

BULLDOZERS, Land Clearing Equipment

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wisc.

•**ALLIS-CHALMERS MFG. CO., TRACTOR DIVISION**, P. O. Box 512, Milwaukee 1, Wisc.

•**AUSTIN-WESTERN CO.**, Aurora, Ill.

THE BAKER MFG. CO., Springfield, Ill.

WM. BROS. BOILER & MFG. CO., 1057 10th Ave. S. E., Minneapolis 14, Minn.

•**BUCYRUS-ERIE CO.**, South Milwaukee, Wisc.

•**CATERPILLAR TRACTOR CO.**, Peoria 8, Ill.

CONSTRUCTION PRODUCTS CORP., 410 San Fernando Road, Los Angeles 31, Calif.

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.

THE HEIL CO., 3000 W. Montana St., Milwaukee 1, Wisc.

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

ISAACSON IRON WKS., Box 3028, Seattle, Wash.

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

M-R-S MANUFACTURING CO., P. O. Box 336, Flora, Miss.

MAINE STEEL INC., South Windham, Me.

THE OLIVER CORP., INDUSTRIAL DIV., 19300 Euclid Ave., Cleveland 17, Ohio

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

TRACTOMOTIVE CORP., County Line Road, Deerfield, Ill.

•**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

WOOLDRIDGE MANUFACTURING CO., Sunnyvale, Calif.

BURNERS, Kiln

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

COMBUSTION EQUIPMENT DIV., TODD SHIPYARDS CORP., 81-16 45th Ave., Elmhurst, Queens, N. Y.

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

ELECTRO-ALLOYS DIV., AMERICAN BRAKE SHOE CO., Taylor St. & Abbey Road, Elyria, Ohio

HAUCK MFG. CO., 124-136 10th St., Brooklyn 15, N. Y.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

THE MACLEOD CO., 2232-40 Bogen St., Cincinnati 22, Ohio

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

STAPLES & PFEIFFER, 528 Bryant St., San Francisco 7, Calif.

BURNERS, OIL, (see Oil Burners)

C

CABLE, Electric

AMERICAN STEEL & WIRE CO., Rockefeller Bldg., Cleveland 13, Ohio

ANACONDA WIRE & CABLE CO., 25 Broadway, New York 4, N. Y.

GENERAL CABLE CORP., 420 Lexington Ave., New York 17, N. Y.

•**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

ROCKBESTOS PRODUCTS CORP., Nicoll St., New Haven 4, Conn.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

CABLE, ELECTRIC, ACCESSORIES, Connectors, Etc.

ALBERT & J. M. ANDERSON MFG. CO., 289-305 A St., Boston 10, Mass.

•**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

CABLE EXCAVATORS

•**AUSTIN-WESTERN CO.**, Aurora, Ill.

BEAUMONT BIRCH CO., 1503 Race St., Philadelphia 2, Pa.

•**BUCYRUS-ERIE CO.**, South Milwaukee, Wis.

JONES & LAUGHLIN STEEL CORP., Third Ave. & Ross St., Pittsburgh 30, Pa.

•**NORTHWEST ENGINEERING CO.**, 135 S. La Salle St., Chicago 3, Ill.

•**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.

•**SAUERMAN BROS., INC.**, 530 S. Clinton St., Chicago 7, Ill.

•**UNIT CRANE & SHOVEL CORP.**, 6411 W. Burnham St., Milwaukee 14, Wis.

CABLEWAYS

ATLAS CORPORATION, Mountville, Pa.

•**BUCYRUS-ERIE CO.**, South Milwaukee, Wis.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

•**SAUERMAN BROS., INC.**, 530 S. Clinton St., Chicago 7, Ill.

SUPERIOR - LIDGERWOOD - MUNDY CORP., Superior, Wis.

INTERSTATE EQUIPMENT DIV., YARA ENGINEERING CORP., 18 W. Jersey St., Elizabeth 4, N. J.

CALCIUM CHLORIDE

THE DOW CHEMICAL CO., Midland, Mich.

PITTSBURGH PLATE GLASS CO., COLUMBIA CHEMICAL DIV., Fifth Ave. at Bellefield, Pittsburgh 13, Pa.

SOLVAY SALES DIVN., ALLIED CHEMICAL & DYE CORP., 40 Rector St., New York 6, N. Y.

TAMMS INDUSTRIES, INC., 228 No. La Salle St., Chicago 1, Ill.

CAPSTANS & WINCHES

•**ALLIS-CHALMERS MFG. CO., TRACTOR DIVISION**, P. O. Box 512, Milwaukee 1, Wis.

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

ATLAS CORPORATION, Mountville, Pa.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.

DOWNS CRANE & HOIST CO., 540 W. Vernon Ave., Los Angeles 37, Calif.

•**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

GAR WOOD INDUSTRIES, INC., Wayne Div., Wayne, Mich.

HENNEUSE ENGINEERING CO., Marion, Ohio

ISAACSON IRON WKS., Box 3028, Seattle, Wash.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

SHEPARD NILES CRANE & HOIST CORP., Schuyler Ave., Montour Falls, N. Y.

SILENT HOIST & CRANE CO., 841 63rd St., Brooklyn 20, N. Y.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

SUPERIOR - LIDGERWOOD - MUNDY CORP., 7 Dey St., New York 7, N. Y.

SUPERIOR - LIDGERWOOD - MUNDY CORP., Superior, Wis.

TULSA WINCH DIVISION OF VICKERS, 815 E. 1st St., Tulsa, 3, Okla.

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

CAR COUPLINGS, WHEELS & LINERS

ATLAS CAR & MFG. CO., 1100 Ivanhoe Rd., Cleveland 10, Ohio

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

CAR DUMPERS

DIFFERENTIAL STEEL CAR CO., Findlay, Ohio

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

THE NOLAN CO., Bowerston, O.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

CAR LOADERS (see Loaders, Car)

CAR MOVERS, Pullers

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

•**ARMSTRONG-BRAY & CO.**, 5364 Northwest Highway, Chicago 30, Ill.

ATLAS CORPORATION, Mountville, Pa.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

•**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

HENNEUSE ENGINEERING CO., Marion, Ohio

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

KEWANEE MANUFACTURING CO., Department RP, Kewanee, Ill.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

SILENT HOIST & CRANE CO., 841 63rd St., Brooklyn 20, N. Y.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

SUPERIOR - LIDGERWOOD - MUNDY CORP., 7 Day St., New York 7, N. Y.

SUPERIOR - LIDGERWOOD - MUNDY CORP., Superior, Wis.

CAR SHAKERS

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

CARS, Concrete Products

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

•**AUSTIN-WESTERN CO.**, Aurora, Ill.

BELL AIRCRAFT CORP., PRIME MOVER DIV., P. O. Box 1, Buffalo 5, N. Y.

•**BESSER MFG. CO.**, Alpena, Mich.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

KWIK-MIX COMPANY, 235 W. Grand Ave., Port Washington, Wis.

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

CARS, Dump

ATLAS CAR & MFG. CO., 1100 Ivanhoe Rd., Cleveland 10, Ohio

•**AUSTIN-WESTERN CO.**, Aurora, Ill.

BELL AIRCRAFT CORP., PRIME MOVER DIV., P. O. Box 1, Buffalo 5, N. Y.

THE CHASE FOUNDRY & MFG. CO., 2300 S. Parsons Ave., Columbus 7, Ohio

DIFFERENTIAL STEEL CAR CO., Findlay, Ohio

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

CARS, Electric, Remote Control

DIFFERENTIAL STEEL CAR CO., Findlay, Ohio

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

CARS, Mine, Quarry, Industrial

ATLAS CAR & MFG. CO., 1100 Ivanhoe Rd., Cleveland 10, Ohio

•**AUSTIN-WESTERN CO.**, Aurora, Ill.

BAKER INDUSTRIAL TRUCK DIV., THE BAKER - RAULANG CO., 1250 W. 80th St., Cleveland 2, Ohio

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.

THE CHASE FOUNDRY & MFG. CO., 2300 S. Parsons Ave., Columbus 7, Ohio

COMMERCIAL METALS CO., Latimer at Corinth St., Dallas, Texas

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

DIFFERENTIAL STEEL CAR CO., Findlay, Ohio

•**EAGLE IRON WORKS**, 137 Holcomb Ave., Des Moines 4, Iowa

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

ORTNER COMPANY, 702 Terrace Plaza, Cincinnati, Ohio

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

CARS, Railroad, Retaining Doors, Strapping

SIGNODE STEEL STRAPPING CO., 2600 N. Western Ave., Chicago 47, Ill.

CARTRIDGES, Rotary, Kiln, Slag Removal

REMINGTON ARMS CO., INC., Barnum Ave., Bridgeport 2, Conn.

WINCHESTER REPEATING ARMS CO., 275 Winchester Ave., New Haven, Conn.

CASTINGS, Repair Parts

1. Bronze
2. Grey Iron
3. Heat Resisting Steel
4. Malleable
5. Manganese
6. Special Alloy
7. Steel

•**AMERICAN MANGANESE STEEL DIV OF AMERICAN BRAKE SHOE CO.**, 377 E. 14th St., Chicago Heights, Ill.
5—7

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.
3—6

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.
1—2—3—5—6—7

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.
1—2—3—4—5—6—7

CALUMET STEEL CASTINGS CORP., 1636 Summer St., Hammond, Ind.
6—7

•**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.
2—4

THE CHASE FOUNDRY & MFG. CO., 2300 S. Parsons Ave., Columbus 7, Ohio
2

COAST METALS, INC., 1232 Camden Ave., S. W., Canton 6, Ohio

•**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.
2

DIAMOND IRON WORKS, INC., 1728 2nd St., No., Minneapolis 11, Minn.
2

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.
2

•**EAGLE IRON WORKS**, 137 Holcomb Ave., Des Moines 4, Iowa
1—2—5—7

•**THE J. B. ENRSAM & SONS MFG. CO.**, Enterprise, Kans.
2

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah
2—3—6—7

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.
3—5—6—7

ELECTRO-ALLOYS DIV., AMERICAN BRAKE SHOE CO., Taylor St., & Abbey Road, Elyria, Ohio
3—6

THE FAHRALLOY CO., 149th Loomis St., Harvey, Ill.
3—6

•**FARREL-BACON**, Ansonia, Conn.
1—2

FARRELL - CHEEK STEEL CO., Sandusky, Ohio
7

FREDERICH IRON & STEEL CO., Frederick, Md.
2

•**THE FROG, SWITCH & MFG. CO.**, Carlisle, Pa.
5

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.
2—7

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.
2

HARDSOGG PNEUMATIC TOOL CO., 225 So. Benton St., Ottumwa, Iowa
2

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.
1—2—7

•**IOWA MFG. CO.**, 916 16th St., N. E., Cedar Rapids, Iowa
2

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
2—4

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.
5—6

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.
2

THE MEDART CO., 100 Potomac St., St. Louis 18, Mo.
2

•**McLANAHAN AND STONE CORP.**, Hollidaysburg, Pa.
1—2

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.
2—6

NATIONAL BEARING DIV., AM. BRAKE SHOE CO., 4930 Manchester St., St. Louis 10, Mo.
1

•**PETTIBONE MULLIKEN CORP.**, 4710 W. Division St., Chicago 51, Ill.
5—6

PYOTT FOUNDRY & MACHINE CO., 328 No. Sangamon St., Chicago 7, Ill.

•**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.
2—7

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.
1—2—3—4—5—6—7

SOUTHERN INDUSTRIAL DIE-CASTING CO., 4th Street S. W. P. O. Box 3631, Moultrie, Ga.
6

SPROUT, WALDRON & CO., INC., Muncy, Pa.
2

STEARNS - ROGERS MFG. CO., 1720 California St., Denver 2, Colo.
3

•**STOODY COMPANY**, Whittier, Calif.

•**TAYLOR - WHARTON IRON & STEEL CO.**, High Bridge, N. J.
5—6—7

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
1—2—7

•**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.
2—6—7

•**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.
5—6

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.
1—2

CEMENT

MEDUSA PORTLAND CEMENT CO., 1000 Midland Bldg., Cleveland 15, Ohio

•**TRINITY PORTLAND CEMENT CO.**, 111 West Monroe St., Chicago 3, Ill.

•**UNIVERSAL ATLAS CEMENT CO.**, Chrysler Bldg., 135 E. 42nd St., New York 17, N. Y.

CEMENT COOLERS (see Coolers, Bulk Cement)

CEMENT DISPERSION AGENTS

A. C. HORN CO., INC., 10th St. & 44th Ave., Long Island City 1, N. Y.

•**THE MASTER BUILDERS CO.**, 7016 Euclid Ave., Cleveland 3, Ohio

MINERAL PIGMENTS CORP., Washington Blvd., Muirkirk, Md.

NOPCO CHEMICAL CO., First and Essex Sts., Harrison, N. J.

REARDON INDUSTRIES INC., 2837 Stanton Ave., Cincinnati 6, Ohio

SIKA CHEMICAL CORP., 35 Gregory Ave., Passaic, N. J.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

SPRAY - O - BOND COMPANY, 2225 N. Humboldt Ave., Milwaukee 12, Wis.

CEMENT AND MASONRY COLORS

COLORCRETE INDUSTRIES, INC., 510 Ottawa Ave., Holland, Mich.

A. C. HORN CO., INC., 10th St. & 44th Ave., Long Island City 1, N. Y.

LANDERS-SEGAL COLOR CO., 78 Delevan St., Brooklyn 31, N. Y.

•**THE MASTER BUILDERS CO.**, 7016 Euclid Ave., Cleveland 3, Ohio

MINERAL PIGMENTS CORP., Washington Blvd., Muirkirk, Md.

MINNESOTA MINING & MFG. CO., 900 Fauguier Ave., St. Paul 6, Minn.

REARDON INDUSTRIES INC., 2837 Stanton Ave., Cincinnati 6, Ohio

RICKETSON MINERAL COLOR WORKS, 229 E. Wisconsin Ave., Milwaukee 6, Wis.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

TAMMS INDUSTRIES, INC., 228 No. LaSalle St., Chicago 1, Ill.

C. K. WILLIAMS & CO., 640 N. 13th St., Easton, Pa.

CEMENT PLANTS, Engineers & Contractors

W. R. BENDY, CEMENT PLANT ENGINEER, 9403 Riverview Dr., St. Louis 15, Mo.

•**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

•**THE C. S. JOHNSON CO.**, Subsidiary Koehring Co., Champaign, Ill.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

HERBERT LAUER, CEMENT PLANT ENGINEER, Land Title Bldg., Broad & Chestnut Sts., Philadelphia, Pa.

MACDONALD ENGINEERING CO., 188 W. Randolph St., Chicago 1, Ill.

NICHOLSON CO., 10 Rockefeller Plaza, New York 20, N. Y.

●**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

●**TAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.

CEMENT PUMPS, Finished Cement (see Pumps, Cement)

CEMENT TESTING APPARATUS

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.

FISHER SCIENTIFIC CO., 717 Forbes St., Pittsburgh 19, Pa.

HUMBOLDT MFG. CO., 2014 N. Whipple St., Chicago 47, Ill.

●**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

SODEMANN HEAT & POWER CO., 2306 Delmar Blvd., St. Louis 3, Mo.

CENTRAL MIXING PLANTS, Concrete

●**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

●**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.

●**CONCRETE TRANSPORT MIXER CO.,** 4985 Fyler Ave., St. Louis, Mo.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

●**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

●**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

MIXERMOBILE MANUFACTURERS, 6855 N. E. Halsey St., P. O. Box 5108, Portland 16, Ore.

●**MULTIPLEX MACHINERY CORP.,** Elmore, Ohio

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

●**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

CENTRIFUGES, Cement Slurry, Etc.

BIRD MACHINE CO., South Walpole, Mass.

CENTRIFUGE MECHANICAL EQPT., INC., 95 River St., Hoboken, N. J.

MERCO CENTRIFUGAL CO., 1045 Sansome St., San Francisco 11, Calif.

CHAIN, Dredge and Shovel

AMERICAN CHAIN DIV., AMERICAN CHAIN & CABLE CO., INC., York, Pa.

●**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.

●**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

CHAIN DRIVES (see Drives)

CHAIN, Elevating and Conveying

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BEAUMONT BIRCH CO., 1503 Race St., Philadelphia 2, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.

●**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

●**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

●**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

FARRELL - CHEEK STEEL CO., Sandusky, Ohio

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.

SPROUT, WALDRON & CO., INC., Muncy, Pa.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

●**TAYLOR - WHARTON IRON & STEEL CO.,** High Bridge, N. J.

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

CHAIN, Heat Exchanger

ELECTRO-ALLOYS DIV., AMERICAN BRAKE SHOE CO., Taylor St. & Abbey Road, Elyria, Ohio

●**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

CHAIN LINKS, Fittings, Hooks, Etc.

AMERICAN CHAIN DIV., AMERICAN CHAIN & CABLE CO., INC., York, Pa.

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

THE THOMAS LAUGHLIN CO., 143 Fore St., Portland 6, Me.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

●**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.

CHAINS, Drag

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

●**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.

●**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

●**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

FARRELL - CHEEK STEEL CO., Sandusky, Ohio

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

SPROUT, WALDRON & CO., INC., Muncy, Pa.

●**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

CHUTE LININGS, Rubber

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.

THE CINCINNATI RUBBER MFG. CO., Franklin Ave., Cincinnati 12, Ohio

THE GALIGHER COMPANY, 545 W. 8th South, Salt Lake City, Utah

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

●**B. F. GOODRICH CO.,** Akron 11, Ohio

●**THE GOODYEAR TIRE & RUBBER CO., INC.,** 1144 E. Market St., Akron 16, Ohio

HAMILTON RUBBER MFG. CORP., Mead St., Trenton 3, N. J.

●**HEWITT RUBBER DIV., HEWITT-ROBINS INC.,** 240 Kensington Ave., Buffalo 5, N. Y.

QUAKER PACIFIC RUBBER CO., 598 Potero Ave., San Francisco 10, Calif.

QUAKER RUBBER CORP., Tacony & Comly Sts., Philadelphia 24, Pa.

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.

REPUBLIC RUBBER DIV., LEE RUBBER & TIRE CORP., Albert St., Youngstown 1, Ohio

●**THERMOID COMPANY,** Trenton, N. J.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

CHUTE LININGS, Other

ALLIED STEEL PRODUCTS, INC., 7835 Broadway, Cleveland 5, Ohio

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

●**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

●**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.

●**TAYLOR - WHARTON IRON & STEEL CO.,** High Bridge, N. J.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

●**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

CHUTES

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

AMERICAN VENTILATING HOSE CO., 15 Park Row, New York 7, N.Y.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

L. BURMEISTER CO., 4535 W. Mitchell St., Milwaukee 14, Wis.

●**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

●**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

MIXERMOBILE MANUFACTURERS, 6855 N. E. Halsey St., P. O. Box 5108, Portland 16, Ore.

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.

●**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

●**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

CIRCUIT BREAKERS, Electric

●**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

●**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

CIRCUIT TESTERS, Electric

●**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

CLARIFIERS, AIR (see Air Filters)

CLARIFIERS, Oil (see Air Filters)

CLASSIFIERS

1. Electrostatic
2. Hydraulic

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.
2

BIRD MACHINE CO., South Walpole, Mass.
2

COLORADO IRON WORKS CO., 1624 17th St., Denver 2, Colo.
2

•**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.
1

THE DEISTER CONCENTRATOR CO., P. O. Box 1, Fort Wayne 1, Ind.
3

•**DEISTER MACHINE CO.**, 1933 East Wayne St., Fort Wayne 4, Ind.
3

•**THE DORR CO., INC.**, Barry Place, Stamford, Conn.
2

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.
2

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.
1—2

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.
2

SEPARATIONS ENGINEERING CO., 110 E. 42nd St., New York 17, N. Y.
1

CLASSIFIERS, SAND (see Sand Recovery Machinery)

CLEANING MACHINES, Bag (see Bag Cleaners)

CLINKER COOLERS

1. Grate
2. Rotary

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.
1—2

•**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.
1

•**FULLER COMPANY**, Fuller Bldg., Catasauqua, Pa.
1

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.
2

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.
2

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.
1—2

McDERMOTT BROS. CO., Ft. of Washington St., Allentown, Pa.
2

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.
1—2

•**NORDBERG MFG. CO.**, 3073 So. Chase Ave., Milwaukee 7, Wis.
2

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.
1—2

•**TRAYLOR ENGINEERING & MFG. CO.**, Allentown, Pa.
2

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
1—2

•**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.
2

CLIPS, WIRE ROPE (see Wire Rope Fittings)

CLOTH, WIRE (see Wire Cloth)

CLUTCH FACINGS (see Brake Linings)

CLUTCHES

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

DODGE MANUFACTURING CORP., Mishawaka, Ind.

•**THE J. B. ENRSAM & SONS MFG. CO.**, Enterprise, Kans.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

•**IOWA MFG. CO.**, 916 16th St. N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

•**MACK MFG. CORP.**, 350 Fifth Ave., New York 1, N. Y.

THE MEDART CO., 100 Potomac St., St. Louis 18, Mo.

MORSE CHAIN CO., 7601 Central Ave., Detroit 8, Mich.

STEARNS MAGNETIC MFG. CO., 675 S. 28th St., Milwaukee 4, Wis.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

COAL PULVERIZING EQUIPMENT

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

•**GRUENDLER CRUSHER & PULVERIZER CO.**, 2920 N. Market St., St. Louis 6, Mo.

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

•**IOWA MFG. CO.**, 916 16th St. N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

•**THE MINE & SMELTER SUPPLY CO.**, 1422 17th St., Denver 17, Colo.

•**NEW HOLLAND MFG. CO.**, Mountville, Pa.

•**RAYMOND PULVERIZER DIV., COMBUSTION ENG. CO. INC.**, 1315 N. Branch St., Chicago 22, Ill.

•**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

WHITING CORP., 15693 Lathrop Ave., Harvey, Ill.

•**WILLIAMS PATENT CRUSHER & PULV. CO.**, 813 Montgomery St., St. Louis 6, Mo.

COAL PULVERIZING EQUIPMENT, Direct-Firing Unit Mills

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

•**RAYMOND PULVERIZER DIV., COMBUSTION ENG. CO., INC.**, 1315 N. Branch St., Chicago 22, Ill.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

THE STRONG-SCOTT MFG. CO., Northwestern Terminal, Minneapolis 13, Minn.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

WHITING CORP., 15693 Lathrop Ave., Harvey, Ill.

COLORS, Cement (see Cement and Masonry Colors)

CONCENTRATING TABLES

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

THE DEISTER CONCENTRATOR CO., P. O. Box 1, Fort Wayne 1, Ind.

•**DEISTER MACHINE CO.**, 1933 East Wayne St., Fort Wayne 4, Ind.

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

•**THE MINE & SMELTER SUPPLY CO.**, 1422 17th St., Denver 17, Colo.

OVERSTROM & SONS, 2213 W. Mission Road, Alhambra, Calif.

SEPARATIONS ENGINEERING CO., 110 E. 42nd St., New York 17, N. Y.

THE SINK AND FLOAT CORP., Empire State Bldg., New York 1, N. Y.

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

CONCRETE BLOCK MACHINES (See Block Machines)

CONCRETE CONTROL Systems, Quality

AUTOMATIC LIQUID METER CO., 1372-1378 E. 15th St., Los Angeles 21, Calif.

•**THE C. S. JOHNSON CO.**, Subsidiary Koehring Co., Champaign, Ill.

SCIENTIFIC CONCRETE SERVICE CORP., 724 Salem Ave., Elizabeth 3, N. J.

CONCRETE MASONRY REINFORCING

THE CARTER-WATERS CORP., 2440 Pennway, Kansas City 8, Mo.

CONCRETE MIXERS

1. Block Plant
2. Continuous
3. Job, Portable

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
1—2

J. W. APPLEY & SON, INC., 829-831 9th St. No., St. Petersburg, Fla.
1

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
1

•**BESSER MFG. CO.**, Alpena, Mich.
1—2

•**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.
3

•**GEO. C. CHRISTOPHER & SON IRON WORKS CO.**, 1220 Blaine, Wichita 1, Kans.
1—2—3

•**CONCRETE TRANSPORT MIXER CO.**, 4985 Fyler Ave., St. Louis, Mo.
1—2—3

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa
1—2—3

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga.
3

DES PLAINES CONCRETE PROD. MACHINERY, 930 North Ave., Des Plaines, Ill.
1

THE DODSON MFG. CO., 1463 Barwise Ave., Wichita 2, Kans.
3

W. E. DUNN MFG. CO., 550 W. 23rd St., Holland, Mich.
3

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.
1

•**GENERAL ENGINES CO.**, 307 Hunter St., Gloucester, N. J.
1

F. C. GEORGE MACHINE CO., INC., 100 S. Westmoreland Dr., Orlando, Fla.
1

GILSON BROTHERS CO., Fredonia, Wis.
3

JACKSON & CHURCH CO., 321 N. Hamilton Ave., Saginaw, Mich.
1

•**THE JAEGER MACHINE CO.**, 550 W. Spring St., Columbus 16, Ohio
3

•**THE KENT MACHINE CO.**, 1931 Thomas St., Cuyahoga Falls, O.
1—2

•**KOEHRING CO.**, 3026 W. Concordia Ave., Milwaukee 10, Wis.
1—2—3

KWIK-MIX COMPANY, 235 W. Grand Ave., Port Washington, Wis.
3

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.
1

THE MILES MFG. CO., P. O. Box 65, Jackson, Mich.
1

LESLIE C. MILLER SUPPLY INC., P. O. Box 7, Bedford, Ohio
1

MISHCO CORP., 615 SW 2nd Ave., Miami, Fla.
1—3

MORTARLESS TILE MACH. CO., INC., 2623 Riverside Dr., Los Angeles 39, Calif.
1

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio
1—2—3

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.
1—2

•**PRASCHAK MACHINE CO.**, Marshfield, Wis.
1

•**THE T. L. SMITH CO.**, 2835 N. 32nd St., Milwaukee 10, Wis.
2—3

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.
1—2

•**STANDARD SAND & MACHINE CO.**, 549 W. Washington Blvd., Chicago 6, Ill.
1

•**STEARNS MFG. CO., INC.**, 600 E. Beecher St., Adrian, Mich.
1

SUPERIOR - LIDGERWOOD - MUNDY CORP., 7 Dey St., New York 7, N. Y.
1—3

UNIVERSAL CONCRETE MCHY. CO., INC., 297 S. High St., Columbus 15, Ohio
1—2—3

UNIVERSAL TAMPERS INC., 1530 N. Adams St., Peoria 3, Ill.
1

WILLARD CONCRETE MACHINERY CO., LTD., 2906 Imperial Highway, Lynwood, Calif.
2

•**WITTEMANN MACHINERY CO.**, Paynters Rd., Farmingdale, N. J.
1

C. M. WOOTEN CO., 2721 N. Central Ave., Knoxville 17, Tenn.
1

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.
1—2—3

THE YODER CO., 5552 Walworth Ave., Cleveland, Ohio
2

CONCRETE MIXERS, Truck (see Bodies, Ready Mixed Concrete)

CONCRETE MIXING PLANTS (see Central Mixing Plants)

CONCRETE PAINTS AND COATINGS

THE CARTER-WATERS CORP., 2440 Pennway, Kansas City 8, Mo.

COLORCRETE INDUSTRIES, INC., 510 Ottawa Ave., Holland, Mich.

A. C. HORN CO., INC., 10th St. & 44th Ave., Long Island City 1, N. Y.

•**THE MASTER BUILDERS CO.**, 7016 Euclid Ave., Cleveland 3, Ohio

REARDON INDUSTRIES INC., 2837 Stanton Ave., Cincinnati 6, Ohio

SIKA CHEMICAL CORP., 35 Gregory Ave., Passaic, N. J.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

SPRAY-O-BOND COMPANY, 2225 N. Humboldt Ave., Milwaukee 12, Wis.

TAMMS INDUSTRIES, INC., 228 No. LaSalle St., Chicago 1, Ill.

TRUSCON LABORATORIES, Caniff & G. T. R. R., Detroit 12, Mich.

CONCRETE PREMIX PLANTS, Dry

•**BUTLER BIN CO.**, Box 407, Waukesha, Wis.

CONCRETE PRODUCTS CURING EQUIPMENT (see Kilns, Concrete Curing)

CONCRETE PRODUCTS HANDLING EQUIPMENT

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

CARPENTER MFG. CO., R. F. D. No. 1, Box 470, Richmond 23, Va.

CONSTRUCTION PRODUCTS CORP., 410 San Fernando Road, Los Angeles 31, Calif.

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 16, Mo.

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.

JACKSON & CHURCH CO., 321 N. Hamilton St., Saginaw, Mich.

LEWIS-SHEPARD PRODUCTS INC., 206 Walnut St., Watertown 72, Mass.

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.

SCHMIDGALL MFG. CO. INC., 307 Cass St., Peoria 2, Ill.

•**UNIT CRANE & SHOVEL CORP.**, 6411 W. Burnham St., Milwaukee 14, Wis.

WILLARD CONCRETE MACHINERY CO., LTD., 2906 Imperial Highway, Lynwood, Calif.

•**WITTEMANN MACHINERY CO.**, Paynters Rd., Farmingdale, N. J.

CONCRETE SPECIALTY FORMS:

A. Bins, Tanks, Silos
1. **Burial Vault**
2. **Cribbing**
3. **Curb & Gutter**
4. **Fence Posts & Poles**
5. **Floor System**
6. **Floor & Roof Slab**
7. **Garbage Disposal Unit**
8. **Garden & Ornamental Furniture**
9. **Joist**
10. **Laundry Tray**
11. **Manhole, Curbing & Blocks**
12. **Partition**
13. **Pipe, Culvert & Sewer**
14. **Septic Tank**
15. **Sill & Lintel**
16. **Step, Precast**
17. **Tile & Conduit**
18. **Walls, Foundation**

ASHLAND VAULT INC., 500-518 Virginia Ave., Ashland 4, Ohio
1—14

BASALT ROCK CO., INC., 8th & River Sts., Napa, Calif.
5—6

•**BERG VAULT CO.**, 1620 Lucas Hunt Rd., St. Louis 20, Mo.
1—14

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
11

•**BESSER MFG. CO.**, Alpena, Mich.
11

CARPENTER MFG. CO., R. F. D. No. 1, Box 470, Richmond 23, Va.
14

CONCRETE INDUSTRIES, INC., 15025 Oxnard St., Van Nuys, Calif.
3—4—8—11—15—16

CONCRETE MACHINERY CO., Hickory, N. C.
8

•**CURRIER'S ENTERPRISES**, 4301 San Fernando Road, Glendale 4, Calif.
7

DES PLAINES CONCRETE PROD. MACHINERY, 930 North Ave., Des Plaines, Ill.
8—11

THE FLEXICORE CO., INC., 1932 E. Monument Ave., Dayton 1, Ohio
5—6

•**GENERAL ENGINES CO.**, 307 Hunter St., Gloucester, N. J.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio
1—3—4—11—14

IRVINGTON FORM & TANK CORP., 43 Cedar St., New York 5, N. Y.
1—3—4—5—6—10—11—13—14—16

•**THE KIRK & BLUM MFG. CO.**, 2838 Spring Grove Ave., Cincinnati 25, Ohio
3—4—6—9—15

METAL FORMS CORP., 3334 N. Booth St., Milwaukee 12, Wis.
A—3—18

MISHCO CORP., 615 SW 2nd Ave., Miami, Fla.
6—11—12—15—17

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio
1—4—5—6—8—9—11—13—14—15—16—17

PRE-CAST STEP FORM CO., 1305 Selby Ave., St. Paul 4, Minn.
16

•**QUINN WIRE & IRON WORKS**, Boone, Iowa
4—11—13—14

SANI-BIN CORP. OF BUFFALO, 338 Scajaquada St., Buffalo 11, N. Y.
7

SYMONS CLAMP & MFG. CO., 4269 Diversey Ave., Chicago 39, Ill.
5—6—12—18

UNIVERSAL CONCRETE MCHY. CO., INC., 297 S. High St., Columbus 15, Ohio
2—13

•**WITTEMANN MACHINERY CO.**, Paynters Rd., Farmingdale, N. J.
11—17

CONCRETE SPECIALTY MACHINES

1. **Chimney & Flue Block**
2. **Fence Post**
3. **Joist & Slab**
4. **Pipe, Culvert & Sewer**
5. **Roof Tile**
6. **Sill & Lintel**
7. **Silo Stave**
8. **Tile & Conduit**

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
1—2—3—4—5—6—7—8

E. P. BARBER CO., 560 W. Valley Blvd., Bloomington, Calif.
5

•**BESSER MFG. CO.**, Alpena, Mich.
1—2—3—7—8

CONCRETE INDUSTRIES, INC., 15025 Oxnard St., Van Nuys, Calif.
2—5—6

•**CONCRETE PIPE MACHINERY CO.**, East Ninth & Division Sts., Sioux City 19, Iowa
4—8

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.
4

•**GENERAL ENGINES CO.**, 307 Hunter St., Gloucester, N. J.
1

HOUSTON CONCRETE MACHINERY, 6600 Washington Ave., Houston 7, Texas
4

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.

•**LITH-I-BAR CO.**, Holland, Mich.
3

MARTIN IRON WORKS, 1222 E. 28th St., Los Angeles, Calif.
4

THE MILES MFG. CO., P. O. Box 65, Jackson, Mich.

LESLIE C. MILLER SUPPLY INC., P. O. Box 7, Bedford, Ohio
8

MISHCO CORP., 615 SW 2nd Ave., Miami, Fla.
5

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio
1—2—3—4—5—6—7—8

•**QUINN WIRE & IRON WORKS**, Boone, Iowa
4

•**STEARNS MFG. CO., INC.**, 600 E. Beecher St., Adrian, Mich.
1

UNIVERSAL CONCRETE MCHY. CO., INC., 297 S. High St., Columbus 15, Ohio
4

•**WITTEMANN MACHINERY CO.**, Paynters Rd., Farmingdale, N. J.
1

C. M. WOOTEN CO., 2721 N. Central Ave., Knoxville 17, Tenn.
8

CONCRETE WATERPROOFING AND DAMPPROOFING

THE BARRETT DIV., ALLIED CHEMICAL & DYE CORP., 40 Rector St., New York 6, N. Y.

THE CARTER-WATERS CORP., 2440 Pennway, Kansas City 8, Mo.

DEWEY AND ALMY CHEMICAL CO., 62 Whittemore Ave., Cambridge 40, Mass.

A. C. HORN CO., INC., 10th St. & 44th Ave., Long Island City 1, N. Y.

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.

•**THE MASTER BUILDERS CO.**, 7016 Euclid Ave., Cleveland 3, Ohio

E. L. MOORE CO., 1931 Oakwood St., Pasadena 7, Calif.

NOPCO CHEMICAL CO., First and Essex Sts., Harrison, N. J.

THE REARDON CO., 2208 N. Second St., St. Louis 6, Mo.

REARDON INDUSTRIES INC., 2837 Stanton Ave., Cincinnati 6, Ohio

SIKA CHEMICAL CORP., 35 Gregory Ave., Passaic, N. J.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

SPRAY-O-BOND COMPANY, 2225 N. Humboldt Ave., Milwaukee 12, Wis.

TAMMS INDUSTRIES, INC., 228 No. LaSalle St., Chicago 1, Ill.

CONDUIT, Electrical

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1, Ohio

CONTROL SYSTEMS

1. **Draft**
2. **Pressure**
3. **Temperature**

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio
1—2—3

THE BRISTOL CO., Waterbury 20, Conn.
1—2—3

THE HAYS CORP., East 8th St., Michigan City, Ind.
1—2

LEEDS & NORTHRUP CO., 4970 Stenton Ave., Philadelphia 44, Pa.
1—2—3

MINNEAPOLIS - HONEYWELL REGULATOR CO., BROWN INSTRUMENTS DIV., Wayne & Windrim Aves., Philadelphia 44, Pa.
1—2—3

PYROMETER INSTRUMENT CO., INC., 92 Portland Ave., Bergenfield, N. J.
3

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

●**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y. 1—2—3

WHEELCO INSTRUMENTS CO., 847 W. Harrison St., Chicago 7, Ill. 3

CONTROLS, Bin and Tank Level

●**FULLER COMPANY**, Fuller Bldg., Catasauqua, Pa.

THE HAYS CORP., East 8th St., Michigan City, Ind.

●**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

CONVERTERS, Electric

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

THE BIN-DICATOR CO., 13946 Kercheval Ave., Detroit 15, Mich.

KATO ENGINEERING CO., 108 Maxfield St., Mankato, Minn.

CONVEYOR BELT TRIPPERS

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

●**A. B. FARQUHAR CO.**, 142 N. Duke St., York, Pa.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**THE GOODYEAR TIRE & RUBBER CO., INC.**, 1144 E. Market St., Akron 16, Ohio

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

●**IOWA MFG. CO.**, 916 16th St. N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

●**PIONEER ENG. WORKS, INC.**, 1515 Central Ave., Minneapolis 13, Minn.

PYOTT FOUNDRY & MACHINE CO., 328 No. Sangamon St., Chicago 7, Ill.

●**SMITH ENGINEERING WORKS**, 508 E. Capitol Dr., Milwaukee 12, Wis.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

TEUSCHER PULLEY AND BELTING CO., 801 N. Second St., St. Louis 2, Mo.

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.

●**UNIVERSAL ENGINEERING CORP.**, 625 C Ave. N. W., Cedar Rapids, Iowa

●**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

CONVEYOR IDLERS, Belt

●**AUSTIN-WESTERN CO.**, Aurora, Ill.

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THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**BONDED SCALE & MACHINE CO.**, 41 Bellview Ave., Columbus 7, Ohio

●**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

COYLE & ROTH, 3024 4th St. S. E., Minneapolis 14, Minn.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

●**IOWA MFG. CO.**, 916 16th St. N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

FRANK A. KREMSER & SONS, INC., 3435-45 N. 5th St., Philadelphia 40, Pa.

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PYOTT FOUNDRY & MACHINE CO., 328 No. Sangamon St., Chicago 7, Ill.

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CONVEYORS, Materials Handling

1. **Aeration**
2. **Air**
3. **Apron**
4. **Belt**
5. **Belt, Portable**
6. **Drag**
7. **Overhead Bridge**
8. **Pan**
9. **Screw**
10. **Vibrating**
11. **Weight Recording**

AJAX FLEXIBLE COUPLING CO., INC., Westfield, N. Y. 10

ALLEN-SHERMAN-HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa. 2

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo. 9

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio 9

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass. 4

●**AUSTIN-WESTERN CO.**, Aurora, Ill. 3—4—5—10

BARBER-GREENE CO., 631 W. Park Ave., Aurora, Ill. 4—5

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio 3—4—5—6—8—9

BEAUMONT BIRCH CO., 1503 Race St., Philadelphia 2, Pa. 2—4—6—7

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis. 2

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif. 4—5—6—8—9

●**BONDED SCALE & MACHINE CO.**, 41 Bellview Ave., Columbus 7, Ohio 4—5—6

●**BOSTON WOVEN HOSE & RUBBER CO.**, P. O. Box 1071, Boston 3, Mass. 4

BROOKS EQUIPMENT & MFG. CO., 408-10 Davenport Road, Knoxville 3, Tenn. 5

L. BURMEISTER CO., 4535 W. Mitchell St., Milwaukee 14, Wis. 4—6—9

●**BUTLER BIN CO.**, Box 407, Waukesha, Wis. 9

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y. 4—5

●**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis. 3—4—6

CHICAGO STEEL FOUNDRY CO., 3720 So. Kedzie Ave., Chicago 32, Ill. 4—9

COLLINS EQUIPMENT & SUPPLY CO., 19 E. Jefferson St., Joliet, Ill. 4

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala. 3—4—6—8—9

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif. 3—4—6—8—9

COYLE & ROTH, 3024 4th St., S. E., Minneapolis 14, Minn. 5

C. R. DANIELS, INC., 4900 Wetheredsville Rd., Baltimore 16, Md. 4

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga. 6

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo. 3—4

DIAMOND IRON WORKS, INC., 1728 2nd St., No., Minneapolis 11, Minn. 4—5

DOWNS CRANE & HOIST CO., 540 W. Vernon Ave., Los Angeles 37, Calif. 7

EAGLE CRUSHER CO., INC., 900 Harding Way E., Galion, Ohio 4

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans. 3—4—9

●**A. B. FARQUHAR CO.**, 142 N. Duke St., York, Pa. 4—5—6

●**FULLER COMPANY**, Fuller Bldg., Catasauqua, Pa. 2

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif. 4

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo. 3—4—5—6—8—9—10

●**GENERAL ENGINES CO.**, 307 Hunter St., Gloucester, N. J. 4

F. C. GEORGE MACHINE CO., INC., 100 S. Westmoreland Dr., Orlando, Fla. 4

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J. 4

●**THE GOODYEAR TIRE & RUBBER CO., INC.**, 1144 E. Market St., Akron 16, Ohio 4—5

●**GRUENDLER CRUSHER & PULVERIZER CO.**, 2920 N. Market St., St. Louis 6, Mo. 3—4—5—6

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y. 3—4—5—6

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo. 4

●**HARDINGE CO., INC.**, 240 Arch St., York, Pa. 2—9

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio 2—4—9—10

HERCULES STEEL PRODUCTS CORP., Sherman St., Galion, Ohio 5

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J. 3—4—10

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill. 3—4—6—7—9

●**IOWA MFG. CO.**, 916 16th St., N. E., Cedar Rapids, Iowa 3—4—5—6—7—8

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio 3—4—5—8—9—10—11

●**JOY MANUFACTURING CO.**, Henry W. Oliver Bldg., Pittsburgh 22, Pa. 1—2—3—4—5—6—7—8—9—10—11

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y. 2—3—4—5—6—8—9

KENSINGTON STEEL CO., 505 Kensington St., Chicago 29, Ill. 3—8

●**THE KIRK & BLUM MFG. CO.**, 2838 Spring Grove Ave., Cincinnati 25, Ohio 3

KORB-PETTIT WIRE FABRICS & IRON WORKS, INC., 1505-15 N. Mascher St., Philadelphia 22, Pa. 3—4

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill. 1—3—4—6—7—8—9—10—11

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis. 3—4—5—6—8—9—10

MANGANESE STEEL FORGE CO., Richmond St., & Castor Ave., Philadelphia 34, Pa. 3—6—9

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo. 3—4—5—6—8

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill. 4—6

●**MERRICK SCALE MFG. CO.**, 180 Autumn St., Passaic, N. J. 11

LESLIE C. MILLER SUPPLY INC., P. O. Box 7, Bedford, Ohio 4

●**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio 4

●**McLANAHAN AND STONE CORP.**, Hollidaysburg, Pa. 3

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans. 3—4—8—9

●**NEW HOLLAND MFG. CO.**, Mountville, Pa. 3—4—5

NOBLE CO., 1860 Seventh St., Oakland 20, Calif. 4

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DIRECTORY

•**PETTIBONE MULLIKEN CORP.,** 4710 W. Division St., Chicago 51, Ill.
4—5—6

•**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.
3—4—5

•**PRASCHAK MACHINE CO.,** Marshfield, Wis.
4

PRODUCTIVE EQUIPMENT CORP., 2926 W. Lake St., Chicago 12, Ill.
10

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.
4

•**RICHARDSON SCALE CO.,** Van Houten Ave., Clifton, N. J.
4—9

W. A. RIDDELL CORP., Bucyrus, Ohio
4

ROBINSON AIR - ACTIVATED CONVEYOR SYSTEMS, 205 E. 42nd St., New York 17, N. Y.
2

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.
3—4—5—8

SALEM TOOL CO., 700 S. Ellsworth St., Salem, Ohio
9

•**SAUERMAN BROS., INC.,** 530 S. Clinton St., Chicago 7, Ill.
2

•**SINTERING MACHINERY CORP., TRANSPORTOMETER DIV.,** 70 Pine St., New York 5, N. Y.
4—11

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.
10

•**SMITH ENGINEERING WORKS,** 508 E. Capitol Dr., Milwaukee 12, Wis.
3—4—5

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.
4

SPROUT, WALDRON & CO., INC., Muncy, Pa.
2—4—6—9

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
3—4—5—6—8—9—10

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.
9

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.
10

•**TAYLOR - WHARTON IRON & STEEL CO.,** High Bridge, N. J.
3

TEUSCHER PULLEY AND BELTING CO., 801 N. Second St., St. Louis 2, Mo.
4

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.
3—4—5—6

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.
3—4—5—6—7—8

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
3—4—6—8—9

•**UNIVERSAL ENGINEERING CORP.,** 625 C Ave., N. W., Cedar Rapids, Iowa
3—4—5—9

•**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.
4

•**VAN ORNUM CO.,** 344 Haddon Ave., Westmont, N. J.
4

THE WELLMAN ENGINEERING CO., 7000 Central Ave., Cleveland 4, Ohio
7

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
4

•**WICKWIRE SPENCER STEEL DIV., THE COLORADO FUEL & IRON CORP.,** 500 Fifth Ave., New York 18, N. Y.
4

WILLARD CONCRETE MACHINERY CO., LTD., 2906 Imperial Highway, Lynwood, Calif.
4

•**WITTEMANN MACHINERY CO.,** Paynters Road, Farmingdale, N. J.
4—6

COOLERS, Bulk Cement

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

•**TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.

COOLERS, Cement Clinker (see Clinker Coolers)

CORRECTING, BASINS, Slurry

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

COUPLINGS, Hose (see Hose Fittings)

COUPLINGS, Pipe

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

THE FLORI PIPE CO., 601-29 E. Red Bud Ave., St. Louis 15, Mo.

VICTAULIC CO. OF AMERICA, 30 Rockefeller Plaza, New York 20, N. Y.

WALWORTH CO., 60 East 42nd St., New York 17, N. Y.

COUPLINGS, Shaft, Flexible Shaft (see Drives)

CRANE, Boom, Cable Stabilizer

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.

M. P. McCAFFREY, INC., 2121 East 25th St., Los Angeles 11, Calif.

"QUICK-WAY" TRUCK SHOVEL CO., 4150 Josephine St., Denver 6, Colo.

CRANES, Crawler

1. Diesel
2. Electric
3. Gasoline

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.
1—2—3

•**AUSTIN-WESTERN CO.,** Aurora, Ill.
1—2—3

BAY CITY SHOVELS, INC., Bay City, Mich.
1—2—3

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.
1—2—3

ELECTRO LIFT, INC., 30 Church St., New York 7, N. Y.
2

THE HANSON CLUTCH & MACHINERY CO., Wall & Miami Sts., Tiffin 15, Ohio
1—3

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.
1—2—3

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.
1—2—3

KEYSTONE DRILLER CO., 8th Ave., Beaver Falls, Pa.
1—2—3

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.
1—2—3

•**LIMA-HAMILTON CORP.,** South Main St., Lima, Ohio
1—2—3

•**LINK-BELT SPEEDER CORP.,** 1201 Sixth St. S. W., Cedar Rapids, Iowa
1—2—3

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.
1—3

MARION POWER SHOVEL CO., 617 W. Center St., Marion, Ohio
1—2—3

MICHIGAN POWER SHOVEL CO., 250 Miller Road, Benton Harbor, Mich.
1—3

•**NORTHWEST ENGINEERING CO.,** 135 S. LaSalle St., Chicago 3, Ill.
1—2—3

ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Ill.
1—2—3

•**THE OSGOOD CO.,** Marion, Ohio
1—2—3

SHEPARD NILES CRANE & HOIST CORP., Schuyler Ave., Montour Falls, N. Y.
2

SILENT HOIST & CRANE CO., 841 63rd St., Brooklyn 20, N. Y.
1—3

•**THE THEW SHOVEL CO.,** 1000 E. 28th St., Lorain, Ohio
1—2—3

•**UNIT CRANE & SHOVEL CORP.,** 6411 W. Burnham St., Milwaukee 14, Wis.
1—2—3

WAYNE CRANE DIV., AMERICAN STEEL DREDGE CO., INC., P. O. Box 570, Fort Wayne 1, Ind.
1—3

THE WELLMAN ENGINEERING CO., 7000 Central Ave., Cleveland 4, Ohio
1—2—3

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
1—3

CRANES, Locomotive

1. Diesel
2. Electric
3. Gasoline
4. Electric Generator

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.
1—2—3—4

BAKER INDUSTRIAL TRUCK DIV., THE BAKER-RAULANG CO., 1250 W. 80th St., Cleveland 2, Ohio
2

THE BROWNING CRANE & SHOVEL CO., 16226 Waterloo Road, Cleveland 10, Ohio
1—3

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.
1—2—3—4

HYSTER CO., 2902 N. E. Clackamas, Portland 8, Ore.
3

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.
1

KEYSTONE DRILLER CO., 8th Ave., Beaver Falls, Pa.
1—2—3

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.
1—2—3

ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Ill.
1—2—3—4—5

SHEPARD NILES CRANE & HOIST CORP., Schuyler Ave., Montour Falls, N. Y.
2

SILENT HOIST & CRANE CO., 841 63rd St., Brooklyn 20, N. Y.
3

CRANES, Truck-Mounted

BAY CITY SHOVELS, INC., Bay City, Mich.

THE BROWNING CRANE & SHOVEL CO., 16226 Waterloo Road, Cleveland 10, Ohio

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.

GAR WOOD INDUSTRIES, INC., Wayne Div., Wayne, Mich.

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SCHIELD BANTAM CO., 216 Park St., Waverly, Iowa

SHEPARD NILES CRANE & HOIST CORP., Schuyler Ave., Montour Falls, N. Y.

SILENT HOIST & CRANE CO., 841 63rd St., Brooklyn 20, N. Y.

•**THE THEW SHOVEL CO.,** 1000 E. 28th St., Lorain, Ohio

•**UNIT CRANE & SHOVEL CORP.,** 6411 W. Burnham St., Milwaukee 14, Wis.

WAYNE CRANE DIV., AMERICAN STEEL DREDGE CO., INC., P. O. Box 570, Fort Wayne 1, Ind.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

CRANES, Hammer Head, Ship, etc.

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Oreg.

ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Ill.

SHEPARD NILES CRANE & HOIST CORP., Schuyler Ave., Montour Falls, N. Y.

THE WELLMAN ENGINEERING CO., 7000 Central Ave., Cleveland 4, Ohio

CRIMPERS, BLASTING CAP (see Blasting Supplies)

CRUSHERS

1. Gyratory
2. Hammer
3. Impact
4. Jaw
5. Laboratory
6. Ring-Roll
7. Roll

ABBE ENGINEERING CO., 50 Church St., New York 7, N. Y.
5—6

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.
1—2—3—4—5—7

•**AMERICAN PULVERIZER CO.,** 1249 Macklind Ave., St. Louis 10, Mo.
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●**AUSTIN-WESTERN CO.,** Aurora, Ill.
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2—7

●**BIRDSBORO STEEL FOUNDRY & MACHINE CO.,** Birdsboro, Pa.
4—5—7

●**BONDED SCALE & MACHINE CO.,** 41 Belliview Ave., Columbus 7, Ohio
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BROOKS EQUIPMENT & MFG. CO., 408-10 Davenport Road, Knoxville 3, Tenn.
2—4

●**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.
1—4—5—7

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.
5

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.
2—4—7

●**DIXIE MACHINERY MFG. CO.,** 4200 Goodfellow Ave., St. Louis 20, Mo.
2

EAGLE CRUSHER CO., INC., 900 Harding Way E., Galion, Ohio
2—3—4

●**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa
7

●**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.
2—4

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Oreg.
2

●**FARREL-BACON,** Ansonia, Conn.
4

●**THE FATE-ROOT-HEATH CO.,** Plymouth, Ohio
7

GILSON BROTHERS CO., Fredonia, Wis.
2

●**GRUENDLER CRUSHER & PULVERIZER CO.,** 2920 N. Market St., St. Louis 6, Mo.
2—3—4—5—6—7

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo.
2

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.
7

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.
5

●**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa
2—3—4—7

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
2—3—4—5—6—7

●**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.
1—2—3—4—5—7

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.
2—7

●**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.
7

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.
1—2—3—4—5—6—7

●**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.
5

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.
4—5—7

●**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.
4—7

●**NEW HOLLAND MFG. CO.,** Mountville, Pa.
2—3—7

●**NORDBERG MFG. CO.,** 3073 So. Chase Ave., Milwaukee 7, Wis.
1—3—4

●**PENNSYLVANIA CRUSHER CO.,** Liberty Trust Bldg., Philadelphia 7, Pa.
1—2—3—4—5—6—7

●**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.
4—7

●**PRASCHAK MACHINE CO.,** Marshfield, Wis.
2

●**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.
2—3—4—5—7

●**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.
2

●**SMITH ENGINEERING WORKS,** 508 E. Capitol Dr., Milwaukee 12, Wis.
1—4—7

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.
1—4—5

STEDMAN FOUNDRY & MACHINE WORKS, INC., Indiana Ave., Aurora, Ind.
2—3—5

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
6—7

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.
1—3—4—5—7

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.
1—2—3—4—5—6—7

SUPERIOR-LIDGERWOOD-MUNDY CORP., 7 Dey St., New York 7, N. Y.
4

●**TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.
1—4—7

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
7

●**UNIVERSAL ENGINEERING CORP.,** 625 C Ave. N. W., Cedar Rapids, Iowa
2—3—4—5—7

●**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.
4

●**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.
7

●**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
1—4

●**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.
2—3—5—6

CRUSHING AND SCREENING PLANTS, Complete

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

●**AUSTIN-WESTERN CO.,** Aurora, Ill.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

●**FARREL-BACON,** Ansonia, Conn.

●**GRUENDLER CRUSHER & PULVERIZER CO.,** 2920 N. Market St., St. Louis 6, Mo.

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo.

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

●**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

●**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

●**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.

●**NEW HOLLAND MFG. CO.,** Mountville, Pa.

●**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

W. A. RIDDELL CORP., Bucyrus, Ohio

●**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

●**SMITH ENGINEERING WORKS,** 508 E. Capitol Dr., Milwaukee 12, Wis.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

●**UNIVERSAL ENGINEERING CORP.,** 625 C Ave. N. W., Cedar Rapids, Iowa

●**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.

CRUSHING AND SCREENING PLANTS, Mobile Mounted

●**AUSTIN-WESTERN CO.,** Aurora, Ill.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

EAGLE CRUSHER CO., INC., 900 Harding Way E., Galion, Ohio

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**GRUENDLER CRUSHER & PULVERIZER CO.,** 2920 N. Market St., St. Louis 6, Mo.

●**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

●**NEW HOLLAND MFG. CO.,** Mountville, Pa.

●**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

●**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

●**SMITH ENGINEERING WORKS,** 508 E. Capitol Dr., Milwaukee 12, Wis.

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

●**UNIVERSAL ENGINEERING CORP.,** 625 C Ave. N. W., Cedar Rapids, Iowa

●**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.

CUPOLAS, Rock Wool (see Rock Wool Cupolas and Equipment)

CURING COMPOUNDS, Concrete

ALUMINUM INDUSTRIES, INC., 2438 Beekman St., Cincinnati 25, Ohio

THE CARTER-WATERS CORP., 2440 Pennway, Kansas City 8, Mo.

DEWEY AND ALMY CHEMICAL CO., 62 Whittemore Ave., Cambridge 40, Mass.

THE DOW CHEMICAL CO., Midland, Mich.

A. C. HORN CO., INC., 10th St. & 44th Ave., Long Island City 1, N. Y.

●**THE MASTER BUILDERS CO.,** 7016 Euclid Ave., Cleveland 3, Ohio

PHILADELPHIA QUARTZ CO., Public Ledger Bldg., 6th & Chestnut Sts., Philadelphia 6, Pa.

REARDON INDUSTRIES, INC., 2837 Stanton Ave., Cincinnati 6, Ohio

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

SPRAY-O-BOND COMPANY, 2225 N. Humboldt Ave., Milwaukee 12, Wis.

CURING ROOM DOORS

UNIVERSAL DOOR CARRIER, INC., 1117 Cornell Ave., Indianapolis 2, Ind.

CUTTER-HEADS, Dredging

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

●**BIRDSBORO STEEL FOUNDRY & MACHINE CO.,** Birdsboro, Pa.

●**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

●**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

●**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

CUTTERS, Fuse (see Blasting Supplies)

CUTTING WHEELS, Abrasive for Concrete

CHAMPION MANUFACTURING CO., 2028 Washington Ave., St. Louis 3, Mo.

RAYBESTOS-MANHATTAN, INC., 61 Willett St., Passaic, N. J.

STONE MACHINERY CO., INC., 399 Fayette St., Manlius, N. Y.

D

DEHYDRATORS (see Slurry Thickeners)

DERRICKS, Barge

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

INGALLS SHIPBUILDING CORP., P. O. Drawer 2638, Birmingham 2, Ala.

SUPERIOR-LIDGERWOOD-MUNDY CORP., Superior, Wis.

DERRICKS, Stiff-Leg and Guy

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

DOWNS CRANE & HOIST CO., 540 W. Vernon Ave., Los Angeles 37, Calif.

•**THE HAYWARD CO.,** 202-204 Fulton St., New York, N. Y.

SUPERIOR-LIDGERWOOD-MUNDY CORP., Superior, Wis.

DETONATORS (see Blasting Supplies)

DEWATERING EQUIPMENT, Sand (see Sand Recovery Machinery)

DIAPHRAGMS, Pumps, Rubber

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

CONTINENTAL RUBBER CO., 1999 Liberty Blvd., Erie, Pa.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

HAMILTON RUBBER MFG. CORP. Mead St., Trenton 3, N. J.

E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

QUAKER RUBBER CORP., Tacony & Comly Sts., Philadelphia 24, Pa.

RAYBESTOS-MANHATTAN, INC., 61 Willett St., Passaic, N. J.

UNITED STATES RUBBER CO., 1230 Ave of the Americas, New York 20, N. Y.

DIESEL ENGINES, Automotive

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.

•**CATERPILLAR TRACTOR CO.,** Peoria 8, Ill.

CONTINENTAL MOTORS CORP., 20 S. Market St., Muskegon, Mich.

•**CUMMINS ENGINE CO., INC.,** Fifth & Wilson Sts., Columbus, Ind.

•**DETROIT DIESEL ENGINE DIV., GENERAL MOTORS CORP.,** 13400 W. Outer Dr., Detroit 28, Mich.

HERCULES MOTORS CORP., 101 Eleventh St., S. E., Canton 2, Ohio

•**LIMA-HAMILTON CORP.,** South Main St., Lima, Ohio

•**MACK MFG. CORP.,** 350 Fifth Ave., New York 1, N. Y.

R. H. SHEPPARD CO., INC., Hanover, Pa.

WAUKESHA MOTOR CO., Box 379, Waukesha, Wis.

DIESEL ENGINES, Stationary

1. Less than 100 H.P.
2. 100-500 H.P.
3. 500-1000 H.P.
4. Over 1000 H.P.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.
1—2—3—4

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.
2—3—4

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.
1—2

•**CATERPILLAR TRACTOR CO.,** Peoria 8, Ill.
1—2

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.
2—3—4

CONTINENTAL MOTORS CORP., 20 S. Market St., Muskegon, Mich.
1—2

•**CUMMINS ENGINE CO., INC.,** Fifth & Wilson Sts., Columbus, Ind.
2—3

•**DETROIT DIESEL ENGINE DIV., GENERAL MOTORS CORP.,** 13400 W. Outer Dr., Detroit 28, Mich.
1—2—3

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.
1—2—3—4

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.
1—2

HERCULES MOTORS CORP., 101 Eleventh St., S. E., Canton 2, Ohio
1—2

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.
2—3—4

•**INTERNATIONAL HARVESTER CO.,** 180 N. Michigan Ave., Chicago 1, Ill.
1—2

LORIMER ENGINE DIV., ATLAS IMPERIAL DIESEL ENGINE CO., 1000 19th Ave., Oakland 6, Calif.
1—2

MURPHY DIESEL CO., 5317 W. Burnham St., Milwaukee 14, Wis.
1—2

•**NORDBERG MFG. CO.,** 3073 So. Chase Ave., Milwaukee 7, Wis.
1—2—3—4

R. H. SHEPPARD CO., INC., Hanover, Pa.
1

WAUKESHA MOTOR CO., Box 379, Waukesha, Wis.
1—2

WITT ENGINE CO., 16th & Oakland Ave., Kansas City, Mo.
1

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.
2—3—4

DIPPER TEETH AND PARTS (see Bucket Lips & Teeth)

DIPPERS, Dredge & Shovel (see Buckets)

DRAFT GAUGES

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio

THE BRISTOL CO., Waterbury 20, Conn.

THE HAYS CORP., East 8th St., Michigan City, Ind.

DRAGLINE CABLEWAY EXCAVATORS

ATLAS CORPORATION, Mountville, Pa.

•**SAUERMAN BROS., INC.,** 530 S. Clinton St., Chicago 7, Ill.

SUPERIOR-LIDGERWOOD-MUNDY CORP., Superior, Wis.

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.

DRAG LINES, Crawler

1. Diesel
2. Electric
3. Gasoline

•**AUSTIN-WESTERN CO.,** Aurora, Ill.
1—2—3

BAY CITY SHOVELS, INC., Bay City, Mich.
1—2—3

THE BROWNING CRANE & SHOVEL CO., 16226 Waterloo Road, Cleveland 10, Ohio
1—3

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.
1—2—3

THE HANSON CLUTCH & MACHINERY CO., Wall & Miami Sts., Tiffin 15, Ohio
1—3

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.
1—2—3

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.
1—2—3

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.
1—2—3

•**LIMA-HAMILTON CORP.,** South Main St., Lima, Ohio
1—2—3

•**LINK-BELT SPEEDER CORP.,** 1201 Sixth St., S. W., Cedar Rapids, Iowa
1—2—3

MANITOWOC ENGINEERING WORKS., Manitowoc, Wis.
1—2—3

MARION POWER SHOVEL CO., 617 W. Center St., Marion, Ohio
1—2—3

MICHIGAN POWER SHOVEL CO., 250 Miller Road, Benton Harbor, Mich.
1—3

•**NORTHWEST ENGINEERING CO.,** 135 S. LaSalle St., Chicago 3, Ill.
1—2—3

•**THE OSGOOD CO.,** Marion, Ohio
1—2—3

•**THE THEW SHOVEL CO.,** 1000 E. 28th St., Lorain, Ohio
1—2—3

•**UNIT CRANE & SHOVEL CORP.,** 6411 W. Burnham St., Milwaukee 14, Wis.
1—2—3

WAYNE CRANE DIV., AMERICAN STEEL DREDGE CO., INC., P. O. Box 570, Fort Wayne 1, Ind.
1—3

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
1—3

DRAGLINES, Truck Mounted

BAY CITY SHOVELS, INC., Bay City, Mich.

THE BROWNING CRANE & SHOVEL CO., 16226 Waterloo Road, Cleveland 10, Ohio

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

THE HANSON CLUTCH & MACHINERY CO., Wall & Miami Sts., Tiffin 15, Ohio

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.

•**LIMA-HAMILTON CORP.,** South Main St., Lima, Ohio

•**LINK-BELT SPEEDER CORP.,** 1201 Sixth St., S. W., Cedar Rapids, Iowa

MICHIGAN POWER SHOVEL CO., 250 Miller Road, Benton Harbor, Mich.

•**NORTHWEST ENGINEERING CO.,** 135 S. LaSalle St., Chicago 3, Ill.

•**THE OSGOOD CO.,** Marion, Ohio

"QUICK-WAY" TRUCK SHOVEL CO., 4150 Josephine St., Denver 6, Colo.

SCHIELD BANTAM CO., 216 Park St., Waverly, Iowa

•**THE THEW SHOVEL CO.,** 1000 E. 28th St., Lorain, Ohio

•**UNIT CRANE & SHOVEL CORP.,** 6411 W. Burnham St., Milwaukee 14, Wis.

WAYNE CRANE DIV., AMERICAN STEEL DREDGE CO., INC., P. O. Box 570, Fort Wayne 1, Ind.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

DRAGLINES, Walking

1. Diesel
2. Electric
3. Gasoline
4. Electric Generator

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.
1—2—3—4

MARION POWER SHOVEL CO., 617 W. Center St., Marion, Ohio
1—2—4

PAGE ENGINEERING CO., Clearing P. O., Chicago 38, Ill.
1—2

DRAGS, Sand (see Sand Recovery Machinery)

DREDGE PIPE AND FITTINGS

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.

•**BIRDSBORO STEEL FOUNDRY & MACHINE CO.,** Birdsboro, Pa.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Oreg.

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

HETHERINGTON & BERNER, INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

KANSAS CITY HAY PRESS CO., 801 Woodswether Road, Kansas City 6, Mo.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

•**MORRIS MACHINE WORKS,** Baldwinsville, N. Y.

TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago 90, Ill.

DREDGE PIPE SLEEVES

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Oreg.

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

•**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

•**THE GOODYEAR TIRE & RUBBER CO., INC.,** 1144 E. Market St., Akron 16, Ohio

HETHERINGTON & BERNER, INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

•**HEWITT RUBBER DIV., HEWITT-ROBINS INC.,** 240 Kensington Ave., Buffalo 5, N. Y.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

•**MORRIS MACHINE WORKS,** Baldwinsville, N. Y.

QUAKER RUBBER CORP., Tacony & Comly Sts., Philadelphia 24, Pa.

RAYBESTOS-MANHATTAN, INC., 61 Willett St., Passaic, N. J.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

DREDGE HOISTS

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

•**MORRIS MACHINE WORKS,** Baldwinsville, N. Y.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

DREDGE PUMPS (see Pumps, Dredge)

DREDGES, Sand & Gravel

1. Bucket
2. Ladder
3. Pump

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.
2—3

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.
1—2—3

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.
1—2—3

•**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa
2

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Oreg.
2—3

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.
1—2—3

ERIE PUMP AND ENGINE WORKS, 145 Glenwood Ave., Medina, N. Y.
3

GEORGIA IRON WORKS CO., 605 12th St., Augusta, Ga.
3

HETHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.
3

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.
1—2—3

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.
2—3

MILLVILLE IRON WORKS, INC., 6th St. & Florence Ave., Millville, N. J.
2—3

•**MORRIS MACHINE WORKS,** Baldwinsville, N. Y.
2

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.
1

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.
1—2

DRIFTERS

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.

GARDNER-DENVER CO., Quincy, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

DRILL BITS (see Bits)

DRILL STEEL

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

GARDNER-DENVER CO., Quincy, Ill.

HARDSOGG PNEUMATIC TOOL CO., 225 So. Benton St., Ottumwa, Iowa

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

•**ROCK BIT SALES & SERVICE CO.,** 2514 E. Cumberland St., Philadelphia 25, Pa.

•**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.

SCHRAMM INC., West Chester, Pa.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

DRILLING ACCESSORIES

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

GARDNER-DENVER CO., Quincy, Ill.

INDEPENDENT PNEUMATIC TOOL CO., 175 State St., Aurora, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

KEYSTONE DRILLER CO., 8th Ave., Beaver Falls, Pa.

SCHRAMM INC., West Chester, Pa.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

DRILLING CABLE, Manila, Sisal, etc.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

THE SANDERSON CYCLONE DRILL CO., 157 S. Main St., Orrville, Ohio

DRILLS, Core

ACKER DRILL CO., INC., 725 W. Lackawanna Ave., Scranton 3, Pa.

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

E. J. LONGYEAR CO., 1701 Foshay Tower, Minneapolis 2, Minn.

SPRAGUE & HENWOOD, INC., 221 W. Olive St., Scranton 2, Pa.

DRILLS, Rock

1. Electric
2. Gasoline
3. Pneumatic

BARCO MANUFACTURING CO., 1801-1815 Winnemac Ave., Chicago 40, Ill.
1—2

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.
3

GARDNER-DENVER CO., Quincy, Ill.
3

HARDSOGG PNEUMATIC TOOL CO., 225 So. Benton St., Ottumwa, Iowa
3

INDEPENDENT PNEUMATIC TOOL CO., 175 State St., Aurora, Ill.
3

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.
1—2—3

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.
3

LEROI CO., 1706 So. 68th St., Milwaukee, Wis.
3

SALEM TOOL CO., 700 S. Ellsworth St., Salem, Ohio
1—2

THE SANDERSON CYCLONE DRILL CO., 157 S. Main St., Orrville, Ohio
1—2

SCHRAMM INC., West Chester, Pa.
3

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.
2

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
3

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.
1—2—3

DRILLS, Stoper

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.

GARDNER-DENVER CO., Quincy, Ill.

INDEPENDENT PNEUMATIC TOOL CO., 175 State St., Aurora, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

SCHRAMM INC., West Chester, Pa.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

DRILLS, Well or Blast-Hole

ACKER DRILL CO., INC., 725 W. Lackawanna Ave., Scranton 3, Pa.

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

GARDNER-DENVER CO., Quincy, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

KEYSTONE DRILLER CO., 8th Ave., Beaver Falls, Pa.

THE LOOMIS MACHINE CO., 15 E. Market St., Tiffin, Ohio

SALEM TOOL CO., 700 S. Ellsworth St., Salem, Ohio

THE SANDERSON CYCLONE DRILL CO., 157 S. Main St., Orrville, Ohio

STAR DRILLING MACHINE CO., 474 Washington St., Akron 11, Ohio

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

DRIVES

1. Chain
2. Flat Belt
3. Flexible Shaft
4. Gear
5. Short Center
6. Variable Speed
7. V-Belt

AJAX FLEXIBLE COUPLING CO., INC., Westfield, N. Y.
3

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.
6—7

AMERICAN FLEXIBLE COUPLING CO., Pittsburgh Ave., Erie, Pa.
3—4

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio
1—4

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.
3

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.
2—7

•**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.
7

THE CLEVELAND WORM & GEAR CO., 3249 E. Eightieth St., Cleveland 4, Ohio
4—6

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.
1—2—3—4—5—6—7

•**THE CONVEYOR CO.,** 3200 East Slauson Ave., Los Angeles 11, Calif.
1—3—4

CROCKER-WHEELER ELECTRIC MFG. CO., DIV. OF ELLIOTT CO., Ampere, N. J.
3

THE DAYTON RUBBER CO., Dayton 1, Ohio
7

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.
3—4—6

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.
4—6

DIAMOND CHAIN CO., INC., 402 Kentucky Ave., Indianapolis 7, Ind.
1—3

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.
3—7

DODGE MANUFACTURING CORP., Mishawaka, Ind.
3—6—7

•**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa
1—6—7

EATON MANUFACTURING CO., 739 E. 140 St., Cleveland 10, Ohio
6

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.
1—2—3—4—5—7

ELECTRIC MACHINERY MFG. CO., 1331 Tyler St., N.E., Minneapolis 13, Minn.
6

THE FALK CORP., 3001 W. Canal St., Milwaukee 8, Wis.
3—4—6

•**FARREL-BIRMINGHAM CO., INC.,** 344 Vulcan St., Buffalo 7, N. Y.
3—4

FOOTE BROS. GEAR & MACHINE CO., 4545 S. Western Ave., Chicago 9, Ill.
6

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.
6—7

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.
1—3

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.
4—6

GRAHAM TRANSMISSIONS INC., 3754 N. Holton St., Milwaukee 12, Wis.
4—6

E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.
2

•**IOWA MFG. CO.,** 916-16th St., N.E., Cedar Rapids, Iowa
4—6

D. O. JAMES MFG. CO., 1114 W. Monroe St., Chicago 7, Ill.
6

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
1—2—3—6

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.
4—6—7

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.
1

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.
3

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.
1—2—3—4—5—6—7

LOVEJOY FLEXIBLE COUPLING CO., 5009 W. Lake St., Chicago 44, Ill.
3—6—7

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.
1—4—6—7

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.
1—2—4—5—7

THE MEDART CO., 100 Potomac St., St. Louis 18, Mo.
1—2—3—4—5—6—7

MORSE CHAIN CO., 7601 Central Ave., Detroit 8, Mich.
1—3

McNALLY - PITTSBURG MFG. CORP., Pittsburg, Kans.
1—2—4—7

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

PHILADELPHIA GEAR WORKS., Erie Ave. & G St., Philadelphia, Pa.
6

REEVES PULLEY CO., Columbus, Ind.
6

RELIANCE ELECTRIC & ENGINEERING CO., 1088 Ivanhoe Rd., Cleveland 10, Ohio
6

•**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.
1—4—7

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
4—6—7

STERLING ELECTRIC MOTORS, INC., 5401 Anaheim-Telegraph Road, Los Angeles 22, Calif.
6

STOW MANUFACTURING CO., 49 Shear St., Binghamton, N. Y.
3

TEUSCHER PULLEY AND BELTING CO., 801 N. Second St., St. Louis 2, Mo.
1—2—3—4—5

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
1—2—4—7

U. S. ELECTRICAL MOTORS INC., 200 E. Slauson Ave., Los Angeles 54, Calif.
6

•**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.
4

JOHN WALDRON CORP., River Road, New Brunswick, N. J.
3

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.
4—6

•**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.
1—2—7

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.
4—6—7

DROP BALLS

•**CAPE ANN ANCHOR & FORGE CO.**, Whittemore St., Gloucester, Mass.

FREDERICK IRON & STEEL CO., Frederick, Md.

DRY PANS

•**EAGLE IRON WORKS**, 137 Holcomb Ave., Des Moines 4, Iowa

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

•**McLANAHAN AND STONE CORP.**, Hollidaysburg, Pa.

W. A. RIDDELL CORP., Bucyrus, Ohio

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

DRYERS, Rotary, Gravel, Rock, Sand

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wisc.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

CENTRIFUGE MECHANICAL EQPT., INC., 95 River St., Hoboken, N. J.

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg., Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

HETHERINGTON & BERNER, INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

ROBERT HOLMES & BROS. INC., 3519 Junction Ave., Danville, Ill.

INDIANA FOUNDRY CO., 150 Clymer Ave., Indiana, Pa.

•**IOWA MFG. CO.**, 916 16th St., N.E., Cedar Rapids, Iowa

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

MILLVILLE IRON WORKS INC., 6th St. & Florence Ave., Millville, N. J.

McDERMOTT BROS. CO., Ft. of Washington St., Allentown, Pa.

•**McLANAHAN AND STONE CORP.**, Hollidaysburg, Pa.

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.

•**NORDBERG MFG. CO.**, 3073 So. Chase Ave., Milwaukee 7, Wisc.

NOVERA INC., 420 Lexington Ave., New York 17, N. Y.

•**PIONEER ENG. WORKS, INC.**, 1515 Central Ave., Minneapolis 13, Minn.

•**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.

•**TRAYLOR ENGINEERING & MFG. CO.**, Allentown, Pa.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.

DRYERS, Plaster Board

CENTRIFUGE MECHANICAL EQPT., INC., 95 River St., Hoboken, N. J.

THE COE MFG. CO., Bank St., Painesville, Ohio

NOVERA INC., 420 Lexington Ave., New York 17, N. Y.

DRYERS, Steam Coil

CENTRIFUGE MECHANICAL EQPT., INC., 95 River St., Hoboken, N. J.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

MILLVILLE IRON WORKS INC., 6th St. & Florence Ave., Millville, N. J.

NOVERA INC., 420 Lexington Ave., New York 17, N. Y.

DUMPING MECHANISMS, Truck

ANTHONY COMPANY, Streator, Ill.

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

GAR WOOD INDUSTRIES, INC., Wayne Div., Wayne, Mich.

KEWANEE MANUFACTURING CO., Department RP, Kewanee, Ill.

THE MARION METAL PRODUCTS CO., Cheney Ave. & Otis St., Marion, Ohio

DUST COLLECTING EQUIPMENT ACCESSORIES

AMERICAN BLOWER CORP., Box 58 Roosevelt Annex, Detroit 32, Mich.

AMERICAN VENTILATING HOSE CO., 15 Park Row, New York 7, N. Y.

AMERICAN WHEELABRATOR & EQUIP. CORP., 439 S. Byrkit St., Mishawaka, Ind.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BEAUMONT BIRCH CO., 1503 Race St., Philadelphia 2, Pa.

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.

CLARK DUST CONTROL CO., 210 N. Mozart St., Chicago 12, Ill.

•**IOWA MFG. CO.**, 916 16th St. N.E., Cedar Rapids, Iowa

•**THE KIRK & BLUM MFG. CO.**, 2838 Spring Grove Ave., Cincinnati 25, Ohio

THE MACLEOD CO., 2232-40 Bogen St., Cincinnati 22, Ohio

THE NORTHERN BLOWER CO., 6408 Barberton Ave., Cleveland 2, Ohio

PANGBORN CORP., Hagerstown, Md.

•**THE W. W. SLY MFG. CO.**, 4700 Train Ave., Cleveland 2, Ohio

WESTERN PRECIPITATION CORP., 1016 West Ninth St., Los Angeles 15, Calif.

WHITING CORP., 15693 Lathrop Ave., Harvey, Ill.

DUST COLLECTORS

1. **Bag Type**
2. **Cyclone**
3. **Electric Precipitators**
4. **Hydraulic**
5. **Portable**

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.
1

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.
2

AMERICAN AIR FILTER CO., INC., 215 Central Ave., Louisville 8, Ky.
1—4—5

AMERICAN BLOWER CORP., Box 58 Roosevelt Annex, Detroit 32, Mich.
2

AMERICAN WHEELABRATOR & EQUIP. CORP., 439 S. Byrkit St., Mishawaka, Ind.

BARBER-GREENE CO., 631 W. Park Ave., Aurora, Ill.
2—3

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio
2—4

BEAUMONT BIRCH CO., 1503 Race St., Philadelphia 2, Pa.
2—4

•**BEMIS BRO. BAG CO.**, 408 Pine St., St. Louis 2, Mo.
1

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.
1—2

BUELL ENGINEERING CO., INC., 70 Pine St., New York 5, N. Y.
2—3

•**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.
2

•**IOWA MFG. CO.**, 916 16th St. N.E., Cedar Rapids, Iowa
2—5

•**THE KIRK & BLUM MFG. CO.**, 2838 Spring Grove Ave., Cincinnati 25, Ohio
2—5

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.
3

THE MACLEOD CO., 2232-40 Bogen St., Cincinnati 22, Ohio
1

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

JAMES H. MARKLEY, 80 Snyder Road, Ramsey, N. J.
1

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio
1—5

THE NORTHERN BLOWER CO., 6408 Barberton Ave., Cleveland 2, Ohio
1—2—4—5

PANGBORN CORP., Hagerstown, Md.
1

•**PIONEER ENG. WORKS, INC.**, 1515 Central Ave., Minneapolis 13, Minn.
2

CLAUDE B. SCHNEIBLE CO., 2827 25th St., Detroit 16, Mich.
4—

SIMPLICITY SYSTEM CO., Riverside Dr., Chattanooga 6, Tenn.
2

•**THE W. W. SLY MFG. CO.**, 4700 Train Ave., Cleveland 2, Ohio
1

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.
1

WESTERN PRECIPITATION CORP., 1016 West Ninth St., Los Angeles 15, Calif.
2—3

•**WILLIAMS PATENT CRUSHER & PULV. CO.**, 813 Montgomery St., St. Louis 6, Mo.
1—2

DUST COLLECTORS, Rock Drill

JAMES H. MARKLEY, 80 Snyder Road, Ramsey, N. J.

DUST SAMPLING AND ANALYZING EQUIPMENT

WESTERN PRECIPITATION CORP., 1016 West Ninth St., Los Angeles 15, Calif.

DYNAMITE AND BLASTING EXPLOSIVES (see Explosives and Dynamite)

E

EARTH MOVING HAULAGE EQUIPMENT, Self Loading

•**ALLIS-CHALMERS MFG. CO., TRACTOR DIVISION**, P. O. Box 512, Milwaukee 1, Wis.

•**BUCYRUS-ERIE CO.**, South Milwaukee, Wis.

•**CATERPILLAR TRACTOR CO.**, Peoria 8, Ill.

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

THE EUCLID ROAD MCHNRY. CO., 1361 Chardon Road, Cleveland 17, Ohio

THE HEIL CO., 3000 W. Montana St., Milwaukee 1, Wis.

HENNEUSE ENGINEERING CO., Marion, Ohio

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

ISAACSON IRON WKS., Box 3028, Seattle, Wash.

LAPLANT-CHOATE MFG. CO., INC., 2920 1st Ave. N.E., Cedar Rapids, Iowa

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

•**SAUERMAN BROS. INC.**, 530 S. Clinton St., Chicago 7, Ill.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

TRACTOMOTIVE CORP., County Line Road, Deerfield, Ill.

ECONOMIZERS, Waste Heat (see Boilers, Waste Heat)

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

ELECTRIC MOTORS

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

THE LOUIS ALLIS CO., 427 E. Stewart St., Milwaukee 7, Wis.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis 3, Mo.

CROCKER-WHEELER ELECTRIC MFG. CO., DIV. OF ELLIOTT CO., Ampere, N. J.

ELECTRIC MACHINERY MFG. CO., 1331 Tyler St. N.E., Minneapolis 13, Minn.

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.

●**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

KATO ENGINEERING CO., 108 Maxfield St., Mankato, Minn.

RELIANCE ELECTRIC & ENGINEERING CO., 1088 Ivanhoe Rd., Cleveland 10, Ohio

STERLING ELECTRIC MOTORS, INC., 5401 Anaheim-Telegraph Road, Los Angeles 22, Calif.

U. S. ELECTRICAL MOTORS INC., 200 E. Slauson Ave., Los Angeles 54, Calif.

WAGNER ELECTRIC CORP., 6400 Plymouth Ave., St. Louis 14, Mo.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

ELECTRIC SWITCH GEAR

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

ELECTRIC MACHINERY MFG. CO., 1331 Tyler St. N.E., Minneapolis 13, Minn.

●**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

INTERNATIONAL DIESEL ELECTRIC CO., INC., 13-02 44th Ave., Long Island City 1, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

ELECTRIC TRANSFORMERS

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

●**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

WAGNER ELECTRIC CORP., 6400 Plymouth Ave., St. Louis 14, Mo.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

ELECTRIC EQUIPMENT AND SUPPLIES

ALBERT & J. M. ANDERSON MFG. CO., 289-305 A St., Boston 10, Mass.

●**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

ELECTRODES, WELDING (see Welding Rods and Electrodes)

ELEVATORS, Chain or Belt & Bucket

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass.

●**AUSTIN-WESTERN CO.**, Aurora, Ill.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BEAUMONT BIRCH CO., 1503 Race St., Philadelphia 2, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**BOSTON WOVEN HOSE & RUBBER CO.**, P. O. Box 1071, Boston 3, Mass.

●**BUTLER BIN CO.**, Box 407, Waukesha, Wis.

●**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

COYLE & ROTH, 3024 4th St. S.E., Minneapolis 14, Minn.

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

EAGLE CRUSHER CO., INC., 900 Harding Way E., Galion, Ohio

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

FLEMING MFG. CO., 4985 Fyler, Ave., St. Louis, Mo.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**THE GOODYEAR TIRE & RUBBER CO., INC.**, 1144 E. Market St., Akron 16, Ohio

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

ROBERT HOLMES & BROS. INC., 3519 Junction Ave., Danville, Ill.

●**IOWA MFG. CO.**, 916 16th St. N.E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

LESLIE C. MILLER SUPPLY INC., P. O. Box 7, Bedford, Ohio

●**McLANAHAN AND STONE CORP.**, Hollidaysburg, Pa.

●**NEW HOLLAND MFG. CO.**, Mountville, Pa.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

O. K. CLUTCH & MCHNRY. CO., Florence St., Columbia, Pa.

●**PIONEER ENG. WORKS, INC.**, 1515 Central Ave., Minneapolis 13, Minn.

●**PRASCHAK MACHINE CO.**, Marshfield, Wis.

●**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.

●**SMITH ENGINEERING WORKS**, 508 E. Capitol Drive, Milwaukee 12, Wis.

SPROUT, WALDRON & CO., INC., Muncy, Pa.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.

●**UNIT CRANE & SHOVEL CORP.**, 6411 W. Burnham St., Milwaukee 14, Wis.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

●**UNIVERSAL ENGINEERING CORP.**, 625 C Ave. N.W., Cedar Rapids, Iowa

●**UNIVERSAL ROAD MACHINERY CO.**, 27 Emerick St., Kingston, N. Y.

●**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.

●**WILLIAMS PATENT CRUSHER & PULV. CO.**, 813 Montgomery St., St. Louis 6, Mo.

●**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.

ELEVATORS, Bulk Cement

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**BUTLER BIN CO.**, Box 407, Waukesha, Wis.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

●**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.

ENGINEERING SERVICE, Consulting and Designing

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.

CHICAGO STEEL FOUNDRY CO., 3720 So. Kedzie Ave., Chicago 32, Ill.

W. R. CLIFFE, L. I. M. E., Engineering Service, Hershey, Pa.

H. C. McCALL, CONCRETE ENG. SERVICE CO., 35 Berkley Place, Columbus 1, Ohio

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

●**THE DORR CO., INC.**, Barry Place, Stamford, Conn.

●**EAGLE IRON WORKS**, 137 Holcomb Ave., Des Moines 4, Iowa

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

THE H. K. FERGUSON CO., Ferguson Building, Cleveland 14, Ohio

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo.

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.

LIME INDUSTRY MANAGEMENT & ENGINEERING, Hershey, Pa.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.

●**MACDONALD ENGINEERING CO.**, 188 West Randolph St., Chicago 1, Ill.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

●**MINERALS DRESSING DIV., AMERICAN CYANAMID CO.**, 30 Rockefeller Plaza, New York 20, N. Y.

●**NEW HOLLAND MFG. CO.**, Mountville, Pa.

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.

NICHOLSON CO., 10 Rockefeller Plaza, New York 20, N. Y.

NOVERA INC., 420 Lexington Ave., New York 17, N. Y.

OVERSTROM & SONS, 2213 W. Mission Road, Alhambra, Calif.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

●**VIBRATION ENGINEERING CO.**, 131 Wyoming St., Hazleton, Pa.

HUGO W. WEIMER CO., 2412 W. State St., Milwaukee 8, Wisc.

●**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

●**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

ENGINES, Diesel (see Diesel Engines)

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

ENGINES

1. Gasoline
2. Kerosene
3. Marine
4. Natural Gas or L. P. G.

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.
1—2—3

●**ALLIS-CHALMERS MFG. CO., TRACTOR DIVISION**, P. O. Box 512, Milwaukee 1, Wis.
1—2—3—4

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.
3

BRIGGS & STRATTON CO., 2711 N. 13th St., Milwaukee 1, Wis.
3

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.
1—3—4

J. I. CASE CO., 700 State St., Racine, Wis.
1—2

●**CHICAGO PNEUMATIC TOOL CO.**, 6 E. 44th St., New York 17, N. Y.
3

●**CHRYSLER INDUSTRIAL ENGINE DIV.**, 12,200 E. Jefferson St., Detroit 31, Mich.
1

CONTINENTAL MOTORS CORP., 20 S. Market St., Muskegon, Mich.
1—2—3—4

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.
1—2—3—4

HERCULES MOTORS CORP., 101 Eleventh St. S.E., Canton 2, Ohio
1—2—4

●**INTERNATIONAL HARVESTER CO.**, 180 N. Michigan Ave., Chicago 1, Ill.
1—2—3—4

LEROI CO., 1706 So. 68th St., Milwaukee, Wis.
1—4

LORIMER ENGINE DIV. ATLAS IMPERIAL DIESEL ENGINE CO., 1000 19th Ave., Oakland 6, Calif.
3—4

●**MACK MFG. CORP.**, 350 Fifth Ave., New York 1, N. Y.
1—3

MINNEAPOLIS-MOLINE CO., P. O. Box 1050, Minneapolis 1, Minn.
1—2—4

●**NORDBERG MFG. CO.**, 3073 So. Chase Ave., Milwaukee 7, Wis.
3—4

NOVO ENGINE CO., 702 Porter St., Lansing 5, Mich.
1—2

WAUKESHA MOTOR CO., Box 379, Waukesha, Wis.
1—2—3

WILLYS-OVERLAND MOTORS, INC., Wolcott Blvd., Toledo 1, Ohio
1

WISCONSIN MOTOR CORP., S. 53rd & Burnham St., Milwaukee 14, Wis.
1—4

WITTE ENGINE CO., 16th & Oakland Ave., Kansas City, Mo.
1—2—3—4

●**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.
3—4

ENTRAINED AIR INDICATORS

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.

EXCAVATORS, Cableway Dragline (see Cable Excavators)

EXCAVATORS, Clamshell (see Cranes)

EXCAVATORS, Scraper (see Cable Excavators)

EXCAVATORS, Tower (see Cableways)

EXHAUSTERS

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.

●**THE KIRK & BLUM MFG. CO.**, 2858 Spring Grove Ave., Cincinnati 25, Ohio

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

●**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.

EXPLOSIVES & DYNAMITE

●**AMERICAN CYANAMID CO.**, Explosives Dept., 30 Rockefeller Plaza, New York 20, N. Y.

●**ATLAS POWDER CO.**, Delaware Trust Bldg., Wilmington, Del.

●**E. I. du PONT de NEMOURS & CO., INC.**, Wilmington, Del.

THE EQUITABLE POWDER MFG. CO., East Alton, Ill.

HERCULES POWDER CO., 946 King St., Wilmington, Del.

ILLINOIS POWDER MFG. CO., 730 Pierce Bldg., St. Louis 2, Mo.

THE KING POWDER CO., INC., P. O. Box 974, Cincinnati 1, Ohio

MILLER MANUFACTURING CO., Mills Bldg., P. O. Dr. 666, El Paso, Tex.

NATIONAL POWDER CO., Eldred, Pa.

TROJAN POWDER CO., 17 N. Seventh St., Allentown, Pa.

F

FANS AND BLOWERS

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.

BUFFALO FORGE CO., 490 Broadway, Buffalo 5, N. Y.

CLARAGE FAN CO., 619 Porter St., Kalamazoo 16, Mich.

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.

THE DeVILBISS CO., 300 Phillips Ave., Toledo 1, Ohio

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

HOMELITE CORP., Riverdale Ave., Port Chester, N. Y.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

●**JOY MANUFACTURING CO.**, Henry W. Oliver Bldg., Pittsburgh 22, Pa.

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

THE NORTHERN BLOWER CO., 6408 Barberton Ave., Cleveland 2, Ohio

FASTENERS, Belt (see Belt Fasteners)

FEEDERS, Concrete

●**MERRICK SCALE MFG. CO.**, 180 Autumn St., Passaic, N. J.

LESLIE C. MILLER SUPPLY INC., P. O. Box 7, Bedford, Ohio

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

●**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.

FEEDERS, Flue Dust

BEAUMONT BIRCH CO., 1503 Race St., Philadelphia 2, Pa.

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.

●**FULLER COMPANY**, Fuller Bldg., Catasauqua, Pa.

●**MERRICK SCALE MFG. CO.**, 180 Autumn St., Passaic, N. J.

●**SINTERING MACHINERY CORP., TRANSPORTOMETER DIV.**, 70 Pine St., New York 5, N. Y.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

FEEDERS

1. Apron
2. Proportioning
3. Reciprocating
4. Screw
5. Table
6. Weight Proportioning
7. Rotary
8. Chain
9. Scale Conveyor

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.
1—3—4—5—6

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.**, 377 E. 14th St., Chicago Heights, Ill.
1

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio
3

●**AUSTIN-WESTERN CO.**, Aurora, Ill.
1

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio
1—3—4—5

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.
1—2—3

●**BONDED SCALE & MACHINE CO.**, 41 Bellview Ave., Columbus 7, Ohio

L. BURMEISTER CO., 4535 W. Mitchell st., Milwaukee 14, Wis.
4

●**BUTLER BIN CO.**, Box 407, Waukesha, Wis.
4

●**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.
1—3—4

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.
1—3—4—5

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.
1—2—3—4—5—6

THE DEISTER CONCENTRATOR CO., P. O. Box 1, Fort Wayne 1, Ind.
2—4—7

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.
1

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.
1—3

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.
1—4

●**FULLER COMPANY**, Fuller Bldg., Catasauqua, Pa.
2—7

THE GALIGHER COMPANY, 545 W. 8th South, Salt Lake City, Utah

●**GRUENDLER CRUSHER & PULVERIZER CO.**, 2920 N. Market St., St. Louis 6, Mo.
1—2—3

●**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.
1—3

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo.
1—3

●**HARDINGE CO., INC.**, 240 Arch St., York, Pa.
6

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio
1—4

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.
1

ROBERT HOLMES & BROS. INC., 3519 Junction Ave., Danville, Ill.
1—3

●**IOWA MFG. CO.**, 916 16th St. N.E., Cedar Rapids, Iowa
1—2—3

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
1—2—3—4—6

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.
1—2—3—4—5—6

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.
1

KORB-PETTIT WIRE FABRICS & IRON WORKS, INC., 1505-15 N. Mascher St., Philadelphia 22, Pa.
1

FRANK A. KREMSER & SONS, INC., 3435-45 N. 5th St., Philadelphia 40, Pa.
3

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.
1—2—3—4—5—6—7—8

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.
1—3—4—5—6—7

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.
1—3

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.
1—4

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.
1—3

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.
1

●**MERRICK SCALE MFG. CO.**, 180 Autumn St., Passaic, N. J.
1—2—3—4—5—6

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.
1

●**McLANAHAN AND STONE CORP.**, Hollidaysburg, Pa.
1—3

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.
1—3—4

●**NEW HOLLAND MFG. CO.**, Mountville, Pa.
1—3

NICHOLAS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.
6

●**NORDBERG MFG. CO.**, 3073 So. Chase Ave., Milwaukee 7, Wis.
1

●**PIONEER ENG. WORKS, INC.**, 1515 Central Ave., Minneapolis 13, Minn.
1—2—3—4

●**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.
1—3

●**ROSS SCREEN & FEEDER CO.**, 19 Rector St., New York 6, N. Y.
1—3

SCHAFFER POIDOMETER CO., 2828 Smallman St., Pittsburgh 22, Pa.
2—6

SIMPLICITY SYSTEM CO., Riverside Dr., Chattanooga 6, Tenn.
1

●**SINTERING MACHINERY CORP., TRANSPORTOMETER DIV.**, 70 Pine St., New York 5, N. Y.
2—6

●**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.
1—2—3—4—5—6

●**SMITH ENGINEERING WORKS**, 508 E. Capitol Dr., Milwaukee 12, Wis.
1—3

SPROUT, WALDRON & CO., INC., Muncy, Pa.
2—4

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
1—2—3—4—5

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.
3—4—5

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.
2—6

•**TAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.
1—3—5

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.
1—3

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
1—3—4—5

•**UNIVERSAL ENGINEERING CORP.,** 625 C Ave. N. W., Cedar Rapids, Iowa
1

•**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.
1

VIBRO-PLUS PRODUCTS, INC., 54-11 Queens Blvd., Woodside, L. I., N. Y.
2—6

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.
1—4

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
1

•**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.
1—2—3—4

•**WITTEMANN MACHINERY CO.,** Paynters Road, Farmingdale, N. J.
3

FILTER CLOTH, Slurry Filter

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

FILTRATION ENGINEERS INC., 155 Grafton St., Newark 4, N. J.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

•**THE W. S. TYLER CO.,** 3615 Superior Ave., Cleveland 14, O.

FILTERS, Cement Slurry (see Slurry Filters)

FIRE BRICK, Kiln Liners, etc. (see Refractories)

FLEXIBLE COUPLINGS (see Drives)

FLOORING, Industrial, Iron and Steel

•**BLAW-KNOX CO.,** Farmers Bank Bldg., Pittsburgh 22, Pa.

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.

•**HENDRICK MFG. CO.,** Carbondale, Pa.

JONES & LAUGHLIN STEEL CORP., Third Ave. & Ross St., Pittsburgh 30, Pa.

KORB-PETTIT WIRE FABRICS & IRON WORKS, INC., 1505-15 N. Mascher St., Philadelphia 22, Pa.

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.

•**THE MASTER BUILDERS CO.,** 7016 Euclid Ave., Cleveland 3, Ohio

•**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.

FLOORING SYSTEMS, Concrete (see Concrete Specialty Forms)

FLOTATION EQUIPMENT

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

THE GALIGHER COMPANY, 545 W. 8th South, Salt Lake City, Utah

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg., Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

•**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.

•**MINERALS DRESSING DIV., AMERICAN CYANAMID CO.,** 30 Rockefeller Plaza, New York 20, N. Y.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

THE SINK AND FLOAT CORP., Empire State Bldg., New York 1, N. Y.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

FLOTATION REAGENTS & SUPPLIES

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

ARMOUR & COMPANY, 1355 W. 31st St., Chicago 9, Ill.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

THE DOW CHEMICAL CO., Midland, Mich.

HERCULES POWDER CO., 946 King St., Wilmington, Del.

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.

•**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.

•**MINERALS DRESSING DIV., AMERICAN CYANAMID CO.,** 30 Rockefeller Plaza, New York 20, N. Y.

NEWPORT INDUSTRIES, INC., 230 Park Ave., New York 17, N. Y.

NOPCO CHEMICAL CO., First and Essex Sts., Harrison, N. J.

ORONITE CHEMICAL CO., 38 Sansome St., San Francisco 4, Calif.

PHILADELPHIA QUARTZ CO., Public Ledger Bldg., 6th & Chestnut Sts., Philadelphia 6, Pa.

SEPARATION PROCESS CO., Fuller Bldg., Catasauqua, Pa.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

FROGS AND SWITCHES, Railway

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.

•**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.

•**PETTIBONE MULLIKEN CORP.,** 4710 W. Division St., Chicago 51, Ill.

•**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.

FURNACES, Forging

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

FUSES, Detonating & Blasting (see Blasting Supplies)

G

GAS ANALYZERS AND RECORDERS

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.

THE HAYS CORP., East 8th St., Michigan City, Ind.

LEEDS & NORTHRUP CO., 4970 Stenton Ave., Philadelphia 44, Pa.

THE PERKIN-ELMER CORP., 535 Hope St., Glenbrook, Conn.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

GAS BURNERS, Natural

•**THE BABCOCK & WILCOX CO.,** 85 Liberty St., New York 6, N. Y.

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

NATIONAL AIROIL BURNER CO., 1298 E. Sedgley Ave., Philadelphia 34, Pa.

RAY OIL BURNER CO., 401 Bernal Ave., San Francisco 12, Calif.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

STAPLES & PFEIFFER, 528 Bryant St., San Francisco 7, Calif.

GAS PRODUCERS

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.

THE WELLMAN ENGINEERING CO., 7000 Central Ave., Cleveland 4, Ohio

GATES (see Bin Gates and Chutes)

GEAR-MOTORS

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

THE FALK CORP., 3001 W. Canal St., Milwaukee 8, Wis.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

STERLING ELECTRIC MOTORS, INC., 5401 Anaheim-Telegraph Road, Los Angeles 22, Calif.

U. S. ELECTRICAL MOTORS INC., 200 E. Slauson Ave., Los Angeles 54, Calif.

WAGNER ELECTRIC CORP., 6400 Plymouth Ave., St. Louis 14, Mo.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

GEAR REDUCERS (see Drives)

GEARS

The C O BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

THE CLEVELAND WORM & GEAR CO., 3249 E. Eightieth St., Cleveland 4, Ohio

•**THE COMMERCIAL SHEARING & STAMPING CO.,** P. O. Box 719, Youngstown 1, Ohio

•**CONTINENTAL GIN CO.,** P. O. Box 2514, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.

DIAMOND IRON WORKS, INC., 1728 2nd St., No. Minneapolis 11, Minn.

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

THE FALK CORP., 3001 W. Canal St., Milwaukee 8, Wis.

•**FARREL - BIRMINGHAM CO., INC.,** 344 Vulcan St., Buffalo 7, N. Y.

FOOTE BROS. GEAR & MACHINE CO., 4545 S. Western Ave., Chicago 9, Ill.

•**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.

GRAHAM TRANSMISSIONS INC., 3754 N. Holton St., Milwaukee 12, Wis.

D. O. JAMES MFG. CO., 1114 W. Monroe St., Chicago 7, Ill.

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.

PHILADELPHIA GEAR WORKS, Erie Ave. & G St., Philadelphia, Pa.

PYOTT FOUNDRY & MACHINE CO., 328 No. Sangamon St., Chicago 7, Ill.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STROH PROCESS STEEL CO., 1428 High St., Pittsburgh 12, Pa.

TEUSCHER PULLEY AND BELTING CO., 801 N. Second St., St. Louis 2, Mo.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

GENERATOR SETS, Electric

1. Diesel Engine
2. Gasoline Engine
3. Electric Motor
4. Turbine

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.
1—2—3

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.
1—2

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

•**CATERPILLAR TRACTOR CO.**, Peoria 8, Ill.
3

•**CHICAGO PNEUMATIC TOOL CO.**, 6 E. 44th St., New York 17, N. Y.
1

CROCKER-WHEELER ELECTRIC MFG. CO., DIV. OF ELLIOTT CO., Ampere, N. J.
4

•**CUMMINS ENGINE CO., INC.**, Fifth & Wilson Sts., Columbus, Ind.
1

DAVEY COMPRESSOR CO., N. Water & Saginor Sts., Kent, Ohio
1—2—3

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.
4

DUPLEX TRUCK CO., 830 E. Hazel St., Lansing 5, Mich.
1—2

ELECTRIC MACHINERY MFG. CO., 1331 Tyler St., N. E., Minneapolis 13, Minn.
3

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.
1—2—3

•**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.
1—2—3—4

HOBART BROTHERS CO., Hobart Square, Troy, Ohio
1—2—3

HOMELITE CORP., Riverdale Ave., Port Chester, N. Y.
2

INTERNATIONAL DIESEL ELECTRIC CO., INC., 13-02 44th Ave., Long Island City 1, N. Y.
1—2

KATO ENGINEERING CO., 108 Maxfield St., Mankato, Minn.
2—3

LEROI CO., 1706 So. 68th St., Milwaukee, Wis.
2

MURPHY DIESEL CO., 5317 W. Burnham St., Milwaukee 14, Wis.
1

RELIANCE ELECTRIC & ENGINEERING CO., 1088 Ivanhoe Rd., Cleveland 10, Ohio
3

R. H. SHEPPARD CO., INC., Hanover, Pa.
1

STERLING MACHINERY CORP., 411 Southwest Blvd., Kansas City 8, Mo.
2

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.
1—2—3—4

LAWRENCE WILSON, 215 Main St., Buffalo, N. Y.
2

WITTE ENGINE CO., 16th & Oakland Ave., Kansas City, Mo.
1

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.
1—3—4

GRAPPLES (see Buckets)

GREASE (see Lubricants)

GRINDERS, for Detachable Bits (see Bits, Grinders)

GRINDING AIDS, Cement

DEWEY AND ALMY CHEMICAL CO., 62 Whittemore Ave., Cambridge 40, Mass.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

GRINDING MEDIA, Mills

ABBE ENGINEERING CO., 50 Church St., New York 7, N. Y.

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.

•**THE COLORADO FUEL & IRON CORP.**, P. O. Box 1920, Denver 1, Colo.

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

•**THE MINE & SMELTER SUPPLY CO.**, 1422 17th St., Denver 17, Colo.

•**RAYMOND PULVERIZER DIV., COMBUSTION ENG. CO. INC.**, 1315 N. Branch St., Chicago 22, Ill.

•**SHEFFIELD STEEL CORP.**, Sheffield Sta., Kansas City 3, Mo.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

GRINDING MILL CONTROLS, Feed Regulators

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

HAMMERMILLS, INC., 1021 Big Bend Blvd., St. Louis 17, Mo.

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

•**THE MINE & SMELTER SUPPLY CO.**, 1422 17th St., Denver 17, Colo.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

GRINDING PEBBLES (see Grinding Media)

GRIZZLIES (see Screens)

GUARDS, Machinery

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

HARRINGTON & KING PERFORATING CO., 5655 Fillmore St., Chicago 44, Ill.

•**THE KIRK & BLUM MFG. CO.**, 2838 Spring Grove Ave., Cincinnati 25, Ohio

THE STANDARD METAL MFG. CO., Malinta, Ohio

•**THE W. S. TYLER CO.**, 3615 Superior Ave., Cleveland 14, Ohio

GUNS & CARTRIDGES, Kiln Ring Removal

REMINGTON ARMS CO., INC., 939 Barnum Ave., Bridgeport 2, Conn.

WINCHESTER REPEATING ARMS CO., 275 Winchester Ave., New Haven, Conn.

GUNS, Hydraulic Monitor (see Monitors, Hydraulic)

GYPSUM PLANT MACHINERY

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

THE HER-BORN ENGR. & MFG. CO., P. O. Box 666, Sandusky, Ohio

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

•**McLANAHAN AND STONE CORP.**, Hollidaysburg, Pa.

NOVERA INC., 420 Lexington Ave., New York 17, N. Y.

•**PENNSYLVANIA CRUSHER CO.**, Liberty Trust Bldg., Philadelphia 7, Pa.

•**RAYMOND PULVERIZER DIV., COMBUSTION ENG. CO. INC.**, 1315 N. Branch St., Chicago 22, Ill.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

•**UNIVERSAL ROAD MACHINERY CO.**, 27 Emerick St., Kingston, N. Y.

GYPSUM PLANTS, Engineers, Contractors

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

NOVERA INC., 420 Lexington Ave., New York 17, N. Y.

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

H

HAMMERMILLS (see Crushers, Hammer)

HARDENERS, Concrete

•**THE MASTER BUILDERS CO.**, 7916 Euclid Ave., Cleveland 3, Ohio

SIKA CHEMICAL CORP., 35 Gregory Ave., Passaic, N. J.

SPRAY-O-BOND COMPANY, 2225 N. Humboldt Ave., Milwaukee 12, Wis.

TAMMS INDUSTRIES, INC., 228 No. LaSalle St., Chicago 1, Ill.

HARD SURFACING METALS (see Welding Rods, Hard Facing)

HEAT EXCHANGERS

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

•**THE BABCOCK & WILCOX CO.**, 85 Liberty St., New York 6, N. Y.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

STAPLES & PFEIFFER, 528 Bryant St., San Francisco 7, Calif.

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.

HEAT TREATING MACHINES, Drill Steel

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

HEATERS, ELECTRIC, Bitumen

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

HEATERS, Plant, Hot Air

CLARAGE FAN CO., 619 Porter St., Kalamazoo 16, Mich.

COMBUSTION EQUIPMENT DIV., TODD SHIPYARDS CORP., 81-16 45th Ave., Elmhurst, Queens, N. Y.

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•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

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•**CHICAGO PNEUMATIC TOOL CO.**, 6 E. 44th St., New York 17, N. Y.

CHISHOLM-MOORE HOIST CORP., Fremont Ave., Tonawanda, N. Y.

•**CLIPPER MFG. CO.**, 2807 Warwick, Kansas City 8, Mo.

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

COFFING HOIST CO., 800 Walter St., Danville, Ill.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

•**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

CURTIS PNEUMATIC MACHINERY CO., 1988 Kienlen Ave., St. Louis 20, Mo.

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

DRAVO CORP., ENGINEERING WKS. DIV., Neville Island, Pittsburgh 6, Pa.

ELECTRO LIFT, INC., 30 Church St., New York 7, N. Y.

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INDEPENDENT PNEUMATIC TOOL CO., 175 State St., Aurora, Ill.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

ISAACSON IRON WKS., Box 3028, Seattle, Wash.

•**THE JAEGER MACHINE CO.**, 550 W. Spring St., Columbus 16, Ohio

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**JOY MANUFACTURING CO.**, Henry W. Oliver Bldg., Pittsburgh 22, Pa.

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DIRECTORY

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O. K. CLUTCH & MACHINERY CO., Florence St., Columbia, Pa.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

ST. PAUL HYDRAULIC HOIST CO., 2207 University Ave. S. E., Minneapolis, Minn.

•**SAUERMAN BROS., INC.,** 530 S. Clinton St., Chicago 7, Ill.

SHEPARD NILES CRANE & HOIST CORP., Schuyler Ave., Montour Falls, N. Y.

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STERLING MACHINERY CORP., 411 Southwest Blvd., Kansas City 8, Mo.

SUPERIOR - LIDGERWOOD - MUNDY CORP., 7 Dey St., New York 7, N. Y.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

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HOPPERS, Aggregates, Cement, etc.

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

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•**AUSTIN-WESTERN CO.,** Aurora, Ill.

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•**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

CONSTRUCTION MACHINERY COS., Glenwood & Vinton Sts., Waterloo, Iowa

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

DRAVO CORP., ENGINEERING WKS. DIV., Neville Island, Pittsburgh 6, Pa.

ERIE STEEL CONST. CO., Giest Road & N. P. R. R., Erie, Pa.

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GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

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THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

•**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

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MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

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NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**WITTEMANN MACHINERY CO.,** Paynters Rd., Farmingdale, N. J.

HOPPERS, Unloading Ready Mixed Concrete

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

•**THE JAEGER MACHINE CO.,** 550 W. Spring St., Columbus 16, Ohio

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

HOSE, Rubber

1. **Hydraulic**
2. **Pneumatic**
3. **Oil**
4. **Sand**

AMERICAN VENTILATING HOSE CO., 15 Park Row, New York 7, N. Y.
2

•**BOSTON WOVEN HOSE & RUBBER CO.,** P. O. Box 1071, Boston 3, Mass.
2—3—4

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.
1—2—3

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.
2

THE CINCINNATI RUBBER MFG. CO., Franklin Ave., Cincinnati 12, Ohio
1—2—3—4

CONTINENTAL RUBBER CO., 1999 Liberty Blvd., Erie, Pa.
1—2—3—4

THE DeVILBISS CO., 300 Phillips Ave., Toledo 1, Ohio
2—3

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah
1—2

GARDNER-DENVER CO., Quincy, Ill.
2

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.
1—2—3—4

L. H. GILMER CO., DIV. OF UNITED STATES RUBBER CO., Tacony 35, Pa.
1—2—3—4

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.
1—2—3—4

•**B. F. GOODRICH CO.,** Akron 11, Ohio
1—2—3—4

•**THE GOODYEAR TIRE & RUBBER CO., INC.,** 1144 E. Market St., Akron 16, Ohio
1—2—3—4

HAMILTON RUBBER MFG. CORP., Mead St., Trenton 3, N. J.
1—2—3—4

•**HEWITT RUBBER DIV., HEWITT-ROBINS INC.,** 240 Kensington Ave., Buffalo 5, N. Y.
1—2—3—4

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.
1—2—3—4

LINCOLN ENGINEERING CO., 5701 Natural Bridge, St. Louis 20, Mo.
3

PANGBORN CORP., Hagerstown, Md.
4

QUAKER PACIFIC RUBBER CO., 598 Potero Ave., San Francisco 10, Calif.
2—3—4

QUAKER RUBBER CORP., Tacony & Comly Sts., Philadelphia 24, Pa.
1—2—3—4

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.
1—2—3—4

REPUBLIC RUBBER DIV., LEE RUBBER & TIRE CORP., Albert St., Youngstown 1, Ohio
1—2—3—4

SCHRAMM INC., West Chester, Pa.
2

STAPLES & PFEIFFER, 528 Bryant St., San Francisco 7, Calif.
3

•**THERMOID COMPANY,** Trenton, N. J.
1—2—3—4

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.
1—2—3—4

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
3

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.
2

HOSE FITTINGS

•**BOSTON WOVEN HOSE & RUBBER CO.,** P. O. Box 1071, Boston 3, Mass.

CARLYLE RUBBER CO., INC., 62-66 Park Pl., New York 7, N. Y.

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.

THE CINCINNATI RUBBER MFG. CO., Franklin Ave., Cincinnati 12, Ohio

CONTINENTAL RUBBER CO., 1999 Liberty Blvd., Erie, Pa.

THE DeVILBISS CO., 300 Phillips Ave., Toledo 1, Ohio

DIXON VALVE & COUPLING CO., Hancock & Columbia Ave., Philadelphia 2, Pa.

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

•**THE GOODYEAR TIRE & RUBBER CO., INC.,** 1144 E. Market St., Akron 16, Ohio

HAMILTON RUBBER MFG. CORP., Mead St., Trenton 3, N. J.

HARDSOGG PNEUMATIC TOOL CO., 225 So. Benton St., Ottumwa, Iowa

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INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

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KNOX MFG. CO., 226 W. Clinton Ave., Oakfyn, N. J.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

•**NEW HAVEN VIBRATOR CO.,** 131 Chestnut St., New Haven 7, Conn.

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.

•**THERMOID COMPANY,** Trenton, N. J.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

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•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

HULLS, Dredge (see Dredges)

HUMIDIFIERS, Laboratory (see Laboratory Apparatus)

HYDRAULIC CYLINDERS

VICKERS INC., DIV. SPERRY CORP., 1400 Oakman Blvd., Detroit 32, Mich.

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•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio

•**THE DORR CO., INC.,** Barry Place, Stamford, Conn.

•**HARDINGE CO., INC.,** 240 Arch St., York, Pa.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

THE KRITZER COMPANY, INC., 2901 Lawrence Ave., Chicago 25, Ill.

OMEGA MACHINE CO., P. O. Box 1342, Providence 1, R. I.

•**TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

HYDROSEPARATORS (see Sand Recovery Machinery)

I

IDLERS, Conveyor (see Conveyor Idlers)

INDICATORS, Bin (see Bin Level Indicators)

INSULATION, Heat (see Refractories)

J

JACKS, HYDRAULIC

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.

LAPLANT-CHOATE MFG. CO. INC., 2920 1st Ave. N. E., Cedar Rapids, Iowa

RODGERS HYDRAULIC INC., 7401 Walker St., Minneapolis 16, Minn.

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JIGS, Sand and Gravel

- **THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.
- **DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.
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OVERSTROM & SONS, 2213 W. Mission Road, Alhambra, Calif.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

K

KETTLES, Gypsum, Calcining

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

- **THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

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KILN PARTS, ENDS, ETC.

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ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

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- **TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

- **VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

KILNS, Curing, Concrete

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

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JACKSON & CHURCH CO., 321 N. Hamilton St., Saginaw, Mich.

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KILNS, Lime, Vertical

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio

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KILNS, Rotary, Cement, Gypsum, Lime

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BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

- **HARDINGE CO., INC.,** 240 Arch St., York, Pa.
- **KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

McDERMOTT BROS. CO., Ft. of Washington St., Allentown, Pa.

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.

- **NORDBERG MFG. CO.,** 3073 So. Chase Ave., Milwaukee 7, Wis.

HOVERA INC., 420 Lexington Ave., New York 17, N. Y.

- **F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.
- **TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

- **VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

L

LABORATORY APPARATUS

- **ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

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THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.

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GENERAL SCIENTIFIC EQUIPMENT CO., 27th & Huntingdon Sts., Philadelphia 32, Pa.

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- **HARDINGE CO., INC.,** 240 Arch St., York, Pa.

HUMBOLDT MFG. CO., 2014 N. Whipple St., Chicago 47, Ill.

LEEDS & NORTHRUP CO., 4970 Stenton Ave., Philadelphia 44, Pa.

MAGNETIC ENGINEERING & MFG. CO., 851 Van Houten Ave., Clifton, N. J.

- **THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.
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WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

THE YODER CO., 5552 Walworth Ave., Cleveland, Ohio

LABORATORIES, Testing

- **ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.
- **DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

THE GALIGHER COMPANY, 545 W. 8th South, Salt Lake City, Utah

- **GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

THE GILSON SCREEN CO., 119 E. Market St., Mercer, Pa.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

LACING, Belt (see Belt Fasteners & Lacing)

LADDERS, Dredge

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.

- **EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

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LARRIES, WEIGH (see Weigh Larries)

LAUNDERS (see Chutes)

LIFT TRUCKS, Concrete Products, etc.

BAKER INDUSTRIAL TRUCK DIV., THE BAKER-RAULANG CO., 1250 W. 80th St., Cleveland 2, Ohio

BARRET-CRAVENS CO., 4629 S. Western Ave., Chicago 9, Ill.

- **BESSER MFG. CO.,** Alpena, Mich.

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.

- **CLARK EQUIPMENT CO., INDUSTRIAL TRUCK DIV.,** Springfield Pt., Battle Creek, Mich.

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

- **ERICKSON POWER LIFT TRUCKS, INC.,** 1401 N. E. Marshall, Minneapolis 18, Minn.

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.

HYSTER CO., 2902 N. E. Clackamas, Portland 8, Ore.

LEWIS-SHEPARD PRODUCTS INC., 206 Walnut St., Watertown 72, Mass.

LIFT TRUCKS, INC., 2425 Spring Grove Ave., Cincinnati 14, Ohio

MIXERMOBILE MANUFACTURERS, 6855 N. E. Halsey St., P. O. Box 5108, Portland 16, Ore.

- **PRASCHAK MACHINE CO.,** Marshfield, Wis.

THE ROSS CARRIER CO., 140 Miller St., Benton Harbor, Mich.

SERVICE CASTER & TRUCK CORP., 500 N. Brownswood Ave., Albion, Mich.

SILENT HOIST & CRANE CO., 841 63rd St., Brooklyn 20, N. Y.

TOWMOTOR CO., 1226 E. 152nd St., Cleveland 10, Ohio

- **WITTEMANN MACHINERY CO.,** Paynters Rd., Farmingdale, N. J.

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.

LIGHTERS, Fuse (see Blasting Supplies)

LIME KILNS (see Kilns)

LIME AND LIMESTONE SPREADERS

ANTHONY COMPANY, Streator, Ill.

BAUGHMAN MFG. CO., Jerseyville, Ill.

EVEN SPREAD CO., Owensville, Ohio

FLINK COMPANY, 502 N. Vermillion St., Streator, Ill.

HERCULES STEEL PRODUCTS CORP., Sherman St., Galion, Ohio

HIGHWAY EQUIPMENT CO., 626 D. Ave., N. W., Cedar Rapids, Iowa

LIME MORTAR & PUTTY PLANTS

LIME INDUSTRY MANAGEMENT & ENGINEERING, Hershey, Pa.

LIME PLANTS

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

THE ELLERMAN CO., 203 Continental Bank Bldg., Salt Lake City 1, Utah

LIME INDUSTRY MANAGEMENT & ENGINEERING, Hershey, Pa.

- **ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

- **VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

LINERS, Kiln (see Refractories)

LINERS, METAL, Grinding Mill

- **ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.
- **AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.
- **THE BABCOCK & WILCOX CO.,** 85 Liberty St., New York 6, N. Y.

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.

- **DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

- **THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.
- **HARDINGE CO., INC.,** 240 Arch St., York, Pa.

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.

- **THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.
- **F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.
- **TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.
- **VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.

LINERS, Pump, Metal

- **AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.
- **DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

- **THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.

- A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

•**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.

LINERS, Pump, Rubber

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

THE FIRESTONE TIRE & RUBBER CO., 1200 Firestone Pkway, Akron 17, Ohio

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

LININGS, CHUTE (see Chute Linings)

LOADERS

1. **Boat**
2. **Car**
3. **Truck**

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.
3

ATHEY PRODUCTS CO., 5631 W. 65th St., Chicago 38, Ill.
2—3

EAGLE CRUSHER CO., INC., 900 Harding Way E., Galion, Ohio
3

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah
2—3

•**GEORGE HAISS MFG. CO.,** Park Ave. & 143rd St., New York 51, N. Y.
1—2—3

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.
2—3

HYSTER CO., 2902 N. E. Clackamas, Portland 8, Ore.
1—2

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.
2

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.
1—2

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.
2

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.
2—3

MIXERMOBILE MANUFACTURERS, 6855 N. E. Halsey St., P. O. Box 5108, Portland 16, Ore.
2—3

N. P. NELSON IRON WORKS, INC., 820 Bloomfield Ave., Clifton, N. J.
3

O. K. CLUTCH & MACHINERY CO., Florence St., Columbia, Pa.
3

•**PETTIBONE MULLIKEN CORP.,** 4710 W. Division St., Chicago 51, Ill.
2—3

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
1—2

TRACTOMOTIVE CORP., County Line Road, Deerfield, Ill.
2—3

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.
3

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.
1—2—3

LOADERS

1. **Tractor**
2. **Underground**

•**ALLIS-CHALMERS MFG. CO., TRACTOR DIVISION,** P. O. Box 512, Milwaukee 1, Wis.
1

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.
1

CONSTRUCTION PRODUCTS CORP., 410 San Fernando Road, Los Angeles 31, Calif.
1

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah
1—2

GARDNER-DENVER CO., Quincy, Ill.
2

•**GEORGE HAISS MFG. CO.,** Park Ave. & 143rd St., New York 51, N. Y.
1

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.
1

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
2

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.
1—2

•**THE KENT MACHINE CO.,** 1931 Thomas St., Cuyahoga Falls, O.
2

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

MAINE STEEL INC., South Windham, Me.
1

THE OLIVER CORP., INDUSTRIAL DIV., 19300 Euclid Ave., Cleveland 17, Ohio
1

OTTAWA STEEL PRODUCTS CO., Ottawa, Kansas

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.
1

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

TRACKSON COMPANY, 333 S. Chase St., Milwaukee 1, Wis.
1—2

TRACTOMOTIVE CORP., County Line Road, Deerfield, Ill.
1

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
1

LOCOMOTIVES

1. **Diesel**
2. **Electric**
3. **Gasoline**
4. **Oil (L.P.G.)**
5. **Storage Battery**

ATLAS CAR & MFG. CO., 1100 Ivanhoe Rd., Cleveland 10, Ohio
1—2

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.
1—2—3

DAVENPORT BESLER CORP., 2305 Rockingham Rd., Davenport, Iowa
1—2—3—4

DIFFERENTIAL STEEL CAR CO., Findlay, Ohio
1—2

•**THE FATE-ROOT-HEATH CO.,** Plymouth, Ohio
1—2—3

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.
1—2—5

INTERNATIONAL DIESEL ELECTRIC CO., INC., 13-02 44th Ave., Long Island City 1, N. Y.
1—3

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
2—5

•**LIMA-HAMILTON CORP.,** South Main St., Lima, Ohio
1

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.
1—2—3—4—5

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.
1—2—3—4—5

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.
1—2—5

THE WHITCOMB LOCOMOTIVE CO., 5th Ave. & 2nd St., Rochelle, Ill.
1—2—3—4—5

LOCOMOTIVES

1. **Diesel-Electric**
2. **Gasoline-Electric**
3. **Oil (L.P.G.)-Electric**

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.
1—2

DAVENPORT BESLER CORP., 2305 Rockingham Rd., Davenport, Iowa
1—2—3

•**THE FATE-ROOT-HEATH CO.,** Plymouth, Ohio
1

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.
1—2—3

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.
1—2—3

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.
1—2—3

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.
1—2—3

THE WHITCOMB LOCOMOTIVE CO., 5th Ave. & 2nd St., Rochelle, Ill.
1—2—3

LOG WASHERS, Aggregates (see Scrubbers)

LUBRICANTS, Grease, Oil, etc.

JOSEPH DIXON CRUCIBLE CO., 167 Wayne St., Jersey City 3, N. J.

LUBRIPLATE DIV., FISKE BROS. REFINING CO., 129 Lockwood St., Newark 5, N. J.

GREDAG, INC., Gluck Building, Niagara Falls, N. Y.

•**GULF OIL CORP.,** Gross St. & P. R. R., Pittsburgh 6, Pa.

E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

KEYSTONE LUBRICATING CO., 21st & Lippincott Sts., Philadelphia 32, Pa.

THE PURE OIL CO., 35 E. Wacker Drive, Chicago 1, Ill.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

SHELL OIL COMPANY, 50 W. 50th St., New York 20, N. Y.

SINCLAIR REFINING CO., 630 Fifth Ave., New York 20, N. Y.

SOCONY-VACUUM OIL CO., 26 Broadway, New York 4, N. Y.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

STANDARD OIL CO. OF CALIF., 225 Bush St., San Francisco 20, Calif.

STANDARD OIL OF INDIANA, 910 S. Michigan Ave., Chicago 5, Ill.

STANDARD OIL CO. (NEW JERSEY), 15 W. 51st St., New York 19, N. Y.

STEWART-WARNER CORP., 1826 W. Diversey Parkway, Chicago 14, Ill.

SUN OIL CO., 1608 Walnut St., Philadelphia, Pa.

SWAN-FINCH OIL CO., 30 Rockefeller Plaza, New York, N. Y.

•**THE TEXAS CO.,** 135 E. 42nd St., New York 17, N. Y.

LUBRICANTS, Wire Rope

AMERICAN STEEL & WIRE CO., Rockefeller Bldg., Cleveland 13, Ohio

JOSEPH DIXON CRUCIBLE CO., 167 Wayne St., Jersey City 3, N. J.

LUBRIPLATE DIV., FISKE BROS. REFINING CO., 129 Lockwood St., Newark 5, N. J.

GREDAG, INC., Gluck Building, Niagara Falls, N. Y.

E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

KEYSTONE LUBRICATING CO., 21st & Lippincott Sts., Philadelphia 32, Pa.

•**A. LESCHEN & SONS ROPE CO.,** 5909 Kennerly Ave., St. Louis 12, Mo.

THE PURE OIL CO., 35 E. Wacker Drive, Chicago 1, Ill.

ROCHESTER ROPES INC., Culpeper, Va.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

SHELL OIL COMPANY, 50 W. 50th St., New York 20, N. Y.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

STEWART-WARNER CORP., 1826 W. Diversey Parkway, Chicago 14, Ill.

SUN OIL CO., 1608 Walnut St., Philadelphia, Pa.

LUBRICATING SYSTEMS

GRAY COMPANY, INC., 60 Eleventh Ave., N. E., Minneapolis 13, Minn.

KEYSTONE LUBRICATING CO., 21st & Lippincott Sts., Philadelphia 32, Pa.

LINCOLN ENGINEERING CO., 5701 Natural Bridge, St. Louis 20, Mo.

OIL-RITE CORP., 3466 S. 13th St., Milwaukee 15, Wis.

STEWART-WARNER CORP., 1826 W. Diversey Parkway, Chicago 14, Ill.

M

MAGNETIC SEPARATORS

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

DINGS MAGNETIC SEPARATOR CO., 509 E. Smith St., Milwaukee, Wis.

THE ELECTRIC CONTROLLER & MFG. CO., 2700 E. 79th St., Cleveland 4, Ohio

ERIEZ MANUFACTURING CO., 631 Commerce Bldg., Erie, Pa.

GALENA MACHINE & ELECTRIC CO., 209-11 Main St., Galena, Kans.

MAGNETIC ENGINEERING & MFG. CO., 851 Van Houten Ave., Clifton, N. J.

SEPARATIONS ENGINEERING CO., 110 E. 42nd St., New York 17, N. Y.

STEARNS MAGNETIC MFG. CO., 675 S. 28th St., Milwaukee 4, Wis.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

MASONRY COLORS (see Cement and Masonry Colors)

MASONRY SAWS

CHAMPION MANUFACTURING CO., 2028 Washington Ave., St. Louis 3, Mo.

•**CLIPPER MFG. CO.,** 2807 Warwick, Kansas City 8, Mo.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

STONE MACHINERY CO., INC., 399 Fayette St., Manlius, N. Y.

VICTOR ENGINEERING CORP., Green Lane & Wilson Ave., Bristol, Pa.

MEASURING DEVICES

1. Weight
2. Volumetric (See Batchers)

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa
1—2

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.
1

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.
1

METERS

1. Electric
2. Water
3. Other Fluids

AUTOMATIC LIQUID METER CO., 1372-1378 E. 15th St., Los Angeles 21, Calif.
2—3

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.
1

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio
2—3

BUILDERS-PROVIDENCE, INC., 9 Codding St., Providence 1, R. I.
2—3

THE FOXBORO CO., Neponset Ave., Foxboro, Mass.
3

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.
1

THE HAYS CORP., East 8th St., Michigan City, Ind.
2—3

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio
2

METHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.
2—3

NEPTUNE METER CO., 20 W. 50th St., New York 20, N. Y.
2

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.
1

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.
2—3

MILLS, Grinding

1. Ball
2. Compartment
3. Laboratory
4. Rod
5. Rail
6. Tube

ABBE ENGINEERING CO., 50 Church St., New York 7, N. Y.
1—3—6

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.
1—4

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wisc.
1—2—4—5—6

•**AMERICAN PULVERIZER CO.,** 1249 Macklind Ave., St. Louis 10, Mo.
3

•**THE BABCOCK & WILCOX CO.,** 85 Liberty St., New York 6, N. Y.
3

BRADLEY PULVERIZER CO., 123 S. Third St., Allentown, Pa.
5

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.
1—3

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.
1—3—4—5

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.
3

EAGLE CRUSHER CO., INC., 900 Harding Way E., Galion, Ohio
1—2—3—4—5—6

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah
1—4

•**HARDINGE CO., INC.,** 240 Arch St., York, Pa.
1—2—3—4—6

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.
1—2—3—4—5—6

•**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.
3—4—5—6

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.
1—3—4—6

•**NORDBERG MFG. CO.,** 3073 So. Chase Ave., Milwaukee 7, Wis.
1—2—4—6

•**PENNSYLVANIA CRUSHER CO.,** Liberty Trust Bldg., Philadelphia 7, Pa.
3—5

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.
1—2—3—4—5—6

•**RAYMOND PULVERIZER DIV., COMBUSTION ENG. CO., INC.,** 1315 N. Branch St., Chicago 22, Ill.
3

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.
1—2—3—6

STEARNS-ROGERS MFG. CO., 1720 California St., Denver 2, Colo.
1—2—3—4

STEDMAN FOUNDRY & MACHINE WORKS, INC., Indiana Ave., Aurora, Ind.
5

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.
1—3—6

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.
3—5

•**TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.
1—2—4—6

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.
1—2—4—5—6

•**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.
1—2—3

MILLS, Washing (see Scrubbers)

MILLS, Hammer (see Crushers, Hammer)

MIXER BODIES, Truck (see Bodies)

MIXERS, Concrete (see Concrete Mixers)

MIXERS, Plaster & Mortar

C. H. & E. MFG. CO., 3849 N. Palmer St., Milwaukee 12, Wis.

•**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.

GILSON BROTHERS CO., Fredonia, Wis.

•**THE JAEGER MACHINE CO.,** 550 W. Spring St., Columbus 16, Ohio

•**THE KENT MACHINE CO.,** 1931 Thomas St., Cuyahoga Falls, Ohio

KWIK-MIX COMPANY, 235 W. Grand Ave., Port Washington, Wis.

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.

•**MULTIPLEX MACHINERY CORP.,** Elmore, Ohio

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

MIXERS, Pugmill

BARBER-GREENE CO., 631 W. Park Ave., Aurora, Ill.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

METHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

•**IOWA MFG. CO.,** 916 16th St., N.E., Cedar Rapids, Iowa

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

•**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

W. A. RIDDELL CORP., Bucyrus, Ohio

SIMPLICITY SYSTEM CO., Riverside Dr., Chattanooga 6, Tenn.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

MIXERS, Slurry (see Slurry Mixers)

MONITORS, Hydraulic

GEORGIA IRON WORKS CO., 605 12th St., Augusta, Ga.

MORTAR COLORS (see Cement & Masonry Colors)

MOTOR TRACTORS, Off-Highway

1. Diesel
2. Gas

THE EUCLID ROAD MCHNRY. CO., 1361 Chardon Road, Cleveland 17, Ohio
1

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.
1—2

•**INTERNATIONAL HARVESTER CO.,** 180 N. Michigan Ave., Chicago 1, Ill.
1—2

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.
1—2

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.
1

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.
1—2

•**MACK MFG. CORP.,** 350 Fifth Ave., New York 1, N. Y.
1—2

MINNEAPOLIS-MOLINE CO., P. O. Box 1050, Minneapolis 1, Minn.
2

WALTER MOTOR TRUCK CO., 1001 Irving Ave., Ridgewood, L. I., N. Y. (Brooklyn P. O.)
1—2

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
2

THE WHITE MOTOR CO., 842 E. 79th St., Cleveland 1, Ohio
1—2

MOTOR TRUCK CONCRETE MIXERS (see Bodies)

MOTOR TRUCK DRIVES AND DIFFERENTIALS, Special

DAVEY COMPRESSOR CO., N. Water & Saginor Sts., Kent, Ohio

EATON MANUFACTURING CO., 739 East 140th St., Cleveland, Ohio

KENWORTH MOTOR TRUCK CORP., 8801 E. Marginal Way, Seattle 11, Wash.

•**MACK MFG. CORP.,** 350 Fifth Ave., New York 1, N. Y.

MARMON-HERRINGTON CO., INC., 1511 W. Washington St., Indianapolis 7, Ind.

STERLING MOTORS CORP., 2021 So. 54th St., Milwaukee 1, Wis.

TRUCK EQUIPMENT CO. INC., 1791 Fillmore Ave., Buffalo 14, N. Y.

UNIVERSAL TAMPERS INC., 1530 N. Adams St., Peoria 3, Ill.

MOTOR TRUCKS, Highway

AUTOCAR CO., Ardmore, Pa.

CHEVROLET MOTOR CO., General Motors Bldg., Detroit 2, Mich.

DART TRUCK CO., Oak at 27th Sts., Kansas City 8, Mo.

DIAMOND T. MOTORTRUCK CO., 4517 W. 26th St., Chicago 23, Ill.

DODGE DIVISION, CHRYSLER CORP., 7900 Jos. Campeau St., Detroit 31, Mich.

DUPLEX TRUCK CO., 830 E. Hazel St., Lansing 5, Mich.

FEDERAL MOTOR TRUCK CO., 5780 Federal St., Detroit 9, Mich.

•**FORD MOTOR CO.,** Administration Bldg., Dearborn, Mich.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis.

•**G. M. C. TRUCK & COACH DIV., YELOW TRUCK & COACH MFG CO.,** South Blvd., Pontiac 11, Mich.

•**INTERNATIONAL HARVESTER CO.,** 180 N. Michigan Ave., Chicago 1, Ill.

KENWORTH MOTOR TRUCK CORP., 8801 E. Marginal Way, Seattle 11, Wash.

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

•**MACK MFG. CORP.,** 350 Fifth Ave., New York 1, N. Y.

REO MOTORS, INC., 1331 So. Washington Ave., Lansing, Mich.

STERLING MOTORS CORP., 2021 So. 54th St., Milwaukee 1, Wis.

THE WHITE MOTOR CO., 842 E. 79th St., Cleveland 1, Ohio

WILLYS-OVERLAND MOTORS, INC., Wolcott Blvd., Toledo 1, Ohio

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

MOTOR TRUCKS, Off-Highway End, Side, Bottom, Dump, Etc.

AUTOCAR CO., Ardmore, Pa.

CHEVROLET MOTOR CO., General Motors Bldg., Detroit 2, Mich.

DIAMOND T. MOTORTRUCK CO., 4517 W. 26th St., Chicago 23, Ill.

THE EUCLID ROAD MCHNRY. CO., 1361 Chardon Road, Cleveland 17, Ohio

FEDERAL MOTOR TRUCK CO., 5780 Federal St., Detroit 9, Mich.

•FORD MOTOR CO., Administration Bldg., Dearborn, Mich.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis.

•G. M. C. TRUCK & COACH DIV., YELOW TRUCK & COACH MFG. CO., South Blvd., Pontiac 11, Mich.

•INTERNATIONAL HARVESTER CO., 180 N. Michigan Ave., Chicago 1, Ill.

KENWORTH MOTOR TRUCK CORP., 8501 E. Marginal Way, Seattle 11, Wash.

•KOEHRING CO., 3026 W. Concordia Ave., Milwaukee 10, Wis.
R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.

•MACK MFG. CORP., 350 Fifth Ave., New York 1, N. Y.

REO MOTORS, INC., 1331 So. Washington Ave., Lansing, Mich.

STERLING MOTORS CORP., 2021 So. 54th St., Milwaukee 1, Wis.

WALTER MOTOR TRUCK CO., 1001 Irving Ave., Ridgewood, L. I., N. Y. (Brooklyn P. O.)

WILLYS-OVERLAND MOTORS, INC., Wolcott Blvd., Toledo 1, Ohio

MOTOR TRUCK TRACTORS, Highway

1. Diesel
2. Gasoline

AUTOCAR CO., Ardmore, Pa.
2

CHEVROLET MOTOR CO., General Motors Bldg., Detroit 2, Mich.
2

DIAMOND T. MOTORTRUCK CO., 4517 W. 26th St., Chicago 23, Ill.
2

DUPLEX TRUCK CO., 830 E. Hazel St., Lansing 5, Mich.
1—2

FEDERAL MOTOR TRUCK CO., 5780 Federal St., Detroit 9, Mich.
2

•FORD MOTOR CO., Administration Bldg., Dearborn, Mich.
2

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis.
1—2

•G. M. C. TRUCK & COACH DIV., YELOW TRUCK & COACH MFG. CO., South Blvd., Pontiac 11, Mich.
1—2

•INTERNATIONAL HARVESTER CO., 180 N. Michigan Ave., Chicago 1, Ill.
1—2

KENWORTH MOTOR TRUCK CORP., 8501 E. Marginal Way, Seattle 11, Wash.
1—2

•MACK MFG. CORP., 350 Fifth Ave., New York 1, N. Y.
1—2

OTTAWA STEEL PRODUCTS CO., Ottawa, Kansas
2

REO MOTORS, INC., 1331 So. Washington Ave., Lansing, Mich.
2

STERLING MOTORS CORP., 2021 So. 54th St., Milwaukee 1, Wis.
1—2

THE WHITE MOTOR CO., 842 E. 79th St., Cleveland 1, Ohio
1—2

MOTORS (see Electric Motors)

N

NOZZLES, Washing

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

•CHAIN BELT CO., 1600 W. Bruce St., Milwaukee 4, Wis.

THE DEISTER CONCENTRATOR CO., P. O. Box 1, Fort Wayne 1, Ind.

•DEISTER MACHINE CO., 1933 East Wayne St., Fort Wayne 4, Ind.

•LINK-BELT CO., 300 W. Pershing Road, Chicago 9, Ill.

SPRAYING SYSTEMS CO., 3201 Randolph St., Bellwood, Ill.

O

OFFBEARERS, Power, Concrete Block

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

•BESSER MFG. CO., Alpena, Mich.

F. C. GEORGE MACHINE CO., INC., 100 S. Westmoreland Dr., Orlando, Fla.

•THE KENT MACHINE CO., 1931 Thomas St., Cuyahoga Falls, Ohio

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.

•STEARNS MFG. CO., INC., 600 E. Beecher St., Adrian, Mich.

•VAN ORNUM CO., 344 Haddon Ave., Westmont, N. J.

•WITTEMANN MACHINERY CO., Paynters Road, Farmingdale, N. J.

OIL BURNERS

•ALLIS-CHALMERS MFG. CO., 975 So. 70th St., Milwaukee 1, Wis.

•THE BABCOCK & WILCOX CO., 85 Liberty St., New York 6, N. Y.

COMBUSTION EQUIPMENT DIV., TODD SHIPYARDS CORP., 81-16 45th Ave., Elmhurst, Queens, N. Y.

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

HAUCK MFG. CO., 124-136 Tenth St., Brooklyn 15, N. Y.

THE MACLEOD CO., 2232-40 Bogen St., Cincinnati 22, Ohio

NATIONAL AIROIL BURNER CO., 1298 E. Sedgley Ave., Philadelphia 34, Pa.

RAY OIL BURNER CO., 401 Bernal Ave., San Francisco 12, Calif.

•F. L. SMIDTH & CO., 11 W. 42nd St., New York 18, N. Y.

STAPLES & PFEIFFER, 528 Bryant St., San Francisco 7, Calif.

OIL FILTERS

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.

FRAM CORPORATION, Providence 16, R. I.

HONAN-CRANE CORP., 600 Wabash Ave., Lebanon, Ind.

LINCOLN ENGINEERING CO., 5701 Natural Bridge, St. Louis 20, Mo.

OIL, Lubricants (see Lubricants)

P

PALLETS, Concrete Products

1. Steel
2. Wood
3. Other

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
1—2—3

J. W. APPLEY & SON, INC., 829-831 9th St. No., St. Petersburg, Fla.
3

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
1

•BESSER MFG. CO., Alpena, Mich.
1—2

•THE COMMERCIAL SHEARING & STAMPING CO., P. O. Box 719, Youngstown 1, Ohio
1

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga.
2—3

THE DOW CHEMICAL CO., Midland, Mich.
3

FRANTZ PATTERN & FOUNDRY CO., 2201 E. Artesia St., Long Beach 5, Calif.
3

•THE FROG, SWITCH & MFG. CO., Carlisle, Pa.
1

•GENERAL ENGINES CO., 307 Hunter St., Gloucester, N. J.
1

F. C. GEORGE MACHINE CO., INC., 100 S. Westmoreland Dr., Orlando, Fla.
3

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.
3

•THE KIRK & BLUM MFG. CO., 2838 Spring Grove Ave., Cincinnati 25, Ohio
1

LEWIS-SHEPARD PRODUCTS INC., 206 Walnut St., Watertown 72, Mass.
2

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.
1—3

THE MILES MFG. CO., P. O. Box 69, Jackson, Mich.
3

MISHCO CORP., 615 SW 2nd Ave., Miami, Fla.
1—3

•MULTIPLEX MACHINERY CORP., Elmore, Ohio
1—2—3

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.
3

SOUTHERN INDUSTRIAL DIE-CASTING CO., 4th Street S.W. (P. O. Box 3631 Moultrie, Ga.
3

•STEARNS MFG. CO., INC., 600 E. Beecher St., Adrian, Mich.
1

UNIVERSAL CONCRETE MCHY. CO., INC., 297 S. High St., Columbus 15, Ohio
1

•WITTEMANN MACHINERY CO., Paynters Road, Farmingdale, N. J.
1

PALLET CLEANERS

BERGEN MACHINE & TOOL CO., 189 Franklin Ave., Nutley 10, N. J.

•SPRINGFIELD PALLET CLEANER & MFG. CO., 501 Southwood Drive., Springfield, Ohio

PANEL BOARDS, Electric

•GENERAL ELECTRIC CO., 1 River Road, Schenectady 5, N. Y.

•THE KIRK & BLUM MFG. CO., 2838 Spring Grove Ave., Cincinnati 25, Ohio

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

PANS, GRINDING, Wet and Dry

•EAGLE IRON WORKS, 137 Holcomb Ave., Des Moines 4, Iowa

•KENNEDY VAN SAUN MFG. & ENG. CORP., 2 Park Ave., New York 16, N. Y.

W. A. RIDDELL CORP., Bucyrus, Ohio

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

PANS, APRON, CONVEYOR (see Conveyors, Apron)

PERFORATED METAL (see Screen Plate)

PHOTO-ELECTRIC CELLS

•THE CONVEYOR CO., 3260 East Slauson Ave., Los Angeles 11, Calif.

•GENERAL ELECTRIC CO., 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

PILLOW BLOCKS (see Blocks, Pillow)

PIPE, Asbestos

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.

PIPE, Dredge, Standard

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

THE FLORI PIPE CO., 601-29 E. Red Bud Ave., St. Louis 15, Mo.

•THE FROG, SWITCH & MFG. CO., Carlisle, Pa.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

NAYLOR PIPE CO., 1237 East 92nd St., Chicago 19, Ill.

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1, Ohio

TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago 90, Ill.

PIPE FITTINGS

THE CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

THE FLORI PIPE CO., 601-29 E. Red Bud Ave., St. Louis 15, Mo.

GEORGIA IRON WORKS CO., 605 12th St., Augusta, Ga.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

NAYLOR PIPE CO., 1237 East 92nd St., Chicago 19, Ill.

VICTAULIC CO. OF AMERICA, 30 Rockefeller Plaza, New York 20, N. Y.

WALWORTH CO., 60 East 42nd St., New York 17, N. Y.

PIPE, Rubber Lined

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

•THE GOODYEAR TIRE & RUBBER CO., INC., 1144 E. Market St., Akron 16, Ohio

NAYLOR PIPE CO., 1237 East 92nd St., Chicago 19, Ill.

RAYBESTOS-MANHATTAN, INC., 61 Willett St., Passaic, N. J.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

PLANERS, Shale

•**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

PLASTER MACHINERY

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

PLASTER MIXERS (see Mixers, Plaster)

PNEUMATIC CONVEYORS (see Conveyors, Air)

POLISHING MACHINES, Concrete

STOW MANUFACTURING CO., 49 Shear St., Binghamton, N. Y.

PONTOONS, Dredge and Pipe

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

HETHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

INGALLS SHIPBUILDING CORP., P. O. Drawer 2638, Birmingham 2, Ala.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

NAYLOR PIPE CO., 1237 East 92nd St., Chicago 19, Ill.

PORTABLE AGGREGATES PLANTS, Crushing & Screening Plants (see Crushing & Screening Plants, Mobile Mounted)

POWDER, Blasting (see Explosives & Dynamite)

POWER STATION EQUIPMENT

ALLEN - SHERMAN - HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa.

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

THE HAYS CORP., East 8th St., Michigan City, Ind.

INTERNATIONAL DIESEL ELECTRIC CO., INC., 13-02 44th Ave., Long Island City 1, N. Y.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**PENNSYLVANIA CRUSHER CO.,** Liberty Trust Bldg., Philadelphia 7, Pa.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

PRECIPITATORS, Dust, Electrical (see Dust Collectors, Electrical)

PREHEATERS, for Kilns, etc.

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

PROPORTIONING EQUIPMENT (see Batchers)

PROTECTIVE COATINGS

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

A. C. HORN CO., INC., 10th St. & 44th Ave., Long Island City 1, N. Y.

E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.

•**THE MASTER BUILDERS CO.,** 7016 Euclid Ave., Cleveland 3, Ohio

GEO. R. MOWAT CO., 24-26 W. 40th St., New York 18, N. Y.

L. SONNEBORN SONS, INC., 300 Fourth Ave., New York 10, N. Y.

SPRAY-O-BOND COMPANY, 2225 N. Humboldt Ave., Milwaukee 12, Wis.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg, Pittsburgh, Pa.

PULLERS, Car (see Car Movers)

PULLERS, Gear, Wheel & Bearing

•**ARMSTRONG-BRAY & CO.,** 5364 Northwest Highway, Chicago 30, Ill.

PULLEYS, Clutch

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

DIAMOND IRON WORKS, INC., 1728 2nd St., No., Minneapolis 11, Minn.

DODGE MANUFACTURING CORP., Mishawaka, Ind.

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

THE MEDART CO., 100 Potomac St., St. Louis 18, Mo.

MINNEAPOLIS - MOLINE CO., P. O. Box 1050, Minneapolis 1, Minn.

PULLEYS, Conveyor and Elevator

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

R. & J. DICK CO., INC., P. O. Box 388, Passaic, N. J.

DODGE MANUFACTURING CORP., Mishawaka, Ind.

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

HARDSOGG PNEUMATIC TOOL CO., 225 So. Benton St., Ottumwa, Iowa

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

•**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.

FRANK A. KREMSER & SONS, INC., 3435-45 N. 5th St., Philadelphia 40, Pa.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

THE MEDART CO., 100 Potomac St., St. Louis 18, Mo.

•**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.

McNALLY - PITTSBURG MFG. CORP., Pittsburg, Kans.

PYOTT FOUNDRY & MACHINE CO., 328 No. Sangamon St., Chicago 7, Ill.

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

SPROUT, WALDRON & CO., INC., Muncy, Pa.

TEUSCHER PULLEY AND BELTING CO., 801 N. Second St., St. Louis 2, Mo.

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

PULLEYS, Magnetl: (see Magnetic Separators)

PULP DENSITY CONTROLERS

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

PULVERIZER FUEL SYSTEMS (see Coal Pulverizing Equipment, Direct Firing)

PULVERIZERS (see Mills)

PUMPS, Air Lift

1. **Cement**
2. **Slurry**
3. **Water**

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.
3

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.
3

CONSTRUCTION MACHINERY CO'S, Glenwood & Vinton Sts., Waterloo, Iowa
3

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.
3

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.
2

ERIE PUMP AND ENGINE WORKS, 145 Glenwood Ave., Medina, N. Y.
2

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.
1

GARDNER-DENVER CO., Quincy, Ill.
3

INDEPENDENT PNEUMATIC TOOL CO., 175 State St., Aurora, Ill.
3

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.
2—3

LAWRENCE MACHINE & PUMP CORP., 871 Market St., Lawrence, Mass.
2—3

ROBINSON AIR - ACTIVATED CONVEYOR SYSTEMS, 205 E. 42nd St., New York 17, N. Y.
1

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.
2

PUMPS, Asphalt

HETHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

MADSEN IRON WORKS, INC., 5631 Bickett St., Huntington Park, Calif.

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

PUMPS, Cement

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

ROBINSON AIR - ACTIVATED CONVEYOR SYSTEMS, 205 E. 42nd St., New York 17, N. Y.

PUMPS, Concrete

•**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.

PUMPS, Dredge

ALLEN - SHERMAN - HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa.

•**AMERICAN MANGANESE STEEL DIV., OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

AMERICAN STEEL DREDGE CO., INC., 2511 Taylor St., Fort Wayne 6, Ind.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

ERIE PUMP AND ENGINE WORKS, 145 Glenwood Ave., Medina, N. Y.

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.

GEORGIA IRON WORKS CO., 605 12th St., Augusta, Ga.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

METHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

BYRON JACKSON CO., 2300 E. Vernon Ave., Los Angeles 11, Calif.

KANSAS CITY HAY PRESS CO., 801 Woodswether Road, Kansas City 6, Mo.

LAWRENCE MACHINE & PUMP CORP., 371 Market St., Lawrence, Mass.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

MILLVILLE IRON WORKS INC., 6th St. & Florence Ave., Millville, N. J.

•**MORRIS MACHINE WORKS**, Baldwinsville, N. Y.

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

PUMPS, Sand

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

ALLEN - SHERMAN - HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa.

•**ALLIS - CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.**, 377 E. 144th St., Chicago Heights, Ill.

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

•**THE DORR CO., INC.**, Barry Place, Stamford, Conn.

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.

ERIE PUMP AND ENGINE WORKS, 145 Glenwood Ave., Medina, N. Y.

GEORGIA IRON WORKS CO., 605 12th St., Augusta, Ga.

METHERINGTON & BERNER INC., 701-745 Kentucky Ave., Indianapolis 7, Ind.

BYRON JACKSON CO., 2300 E. Vernon Ave., Los Angeles 11, Calif.

KANSAS CITY HAY PRESS CO., 801 Woodswether Road, Kansas City 6, Mo.

LAWRENCE MACHINE & PUMP CORP., 371 Market St., Lawrence, Mass.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

MILLVILLE IRON WORKS INC., 6th St. & Florence Ave., Millville, N. J.

PEKOR IRON WORKS, Ft. of E. 9th St., Columbus, Ga.

•**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

•**A. R. WILFLEY & SONS, INC.**, P. O. Box 2330, Denver 1, Colo.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

PUMPS, Slurry

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

ALLEN - SHERMAN - HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa.

•**ALLIS - CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.**, 377 E. 144th St., Chicago Heights, Ill.

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

•**THE DORR CO., INC.**, Barry Place, Stamford, Conn.

ERIE PUMP AND ENGINE WORKS, 145 Glenwood Ave., Medina, N. Y.

GALENA MACHINE & ELECTRIC CO., 209-11 Main St., Galena, Kans.

GEORGIA IRON WORKS CO., 605 12th St., Augusta, Ga.

GOULDS PUMPS, INC., 200 Fall St., Seneca Falls, N. Y.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.

BYRON JACKSON CO., 2300 E. Vernon Ave., Los Angeles 11, Calif.

•**KOEHRING CO.**, 3026 W. Concordia Ave., Milwaukee 10, Wis.

LAWRENCE MACHINE & PUMP CORP., 371 Market St., Lawrence, Mass.

MILLVILLE IRON WORKS INC., 6th St. & Florence Ave., Millville, N. J.

•**MORRIS MACHINE WORKS**, Baldwinsville, N. Y.

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.

•**PETTIBONE MULLIKEN CORP.**, 4710 W. Division St., Chicago 51, Ill.

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

•**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

•**A. R. WILFLEY & SONS, INC.**, P. O. Box 2330, Denver 1, Colo.

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.

PUMPS

1. **Centrifugal**
2. **Deep Well**
3. **Diaphragm**
4. **Rubber-Lined**
5. **Vacuum**
6. **Hydraulic**

ALLEN - SHERMAN - HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa.
6

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.
4

•**ALLIS - CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.
1—4—5

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.**, 377 E. 144th St., Chicago Heights, Ill.
1

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.
1

•**BIRDSBORO STEEL FOUNDRY & MACHINE CO.**, Birdsboro, Pa.
1

C. H. & E. MFG. CO., 3849 N. Palmer St., Milwaukee 12, Wis.
1—3

CARVER PUMP CO., 1056 Hershey Ave., Muscatine, Iowa
1—3

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.
5

•**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.
1—3

•**CHICAGO PNEUMATIC TOOL CO.**, 6 E. 44th St., New York 17, N. Y.
5

CONSTRUCTION MACHINERY CO'S., Glenwood & Vinton Sts., Waterloo, Iowa
1—3

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.
1

•**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.
1—3—4

•**THE DOOR CO., INC.**, Barry Place, Stamford, Conn.
3—4

ELLICOTT MACHINE CORP., 1611 Bush St., Baltimore 30, Md.
1

ERIE PUMP AND ENGINE WORKS, 145 Glenwood Ave., Medina, N. Y.
1

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.
1—2

FREDERICK IRON & STEEL CO., Frederick, Md.
1

•**FULLER COMPANY**, Fuller Bldg., Catasauqua, Pa.
5

GALENA MACHINE & ELECTRIC CO., 209-11 Main St., Galena, Kans.
1—3

GARDNER-DENVER CO., Quincy, Ill.
1—5

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.
4

GOULDS PUMPS, INC., 200 Fall St., Seneca Falls, N. Y.
1

•**HARDINGE CO., INC.**, 240 Arch St., York, Pa.
1

HOMELITE CORP., Riverdale Ave., Port Chester, N. Y.
1

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.
1—2—5

BYRON JACKSON CO., 2300 E. Vernon Ave., Los Angeles 11, Calif.
1—2

JACUZZI BROS. INC., 5327 Jacuzzi Ave., Richmond, Calif.
1—2

•**THE JAEGER MACHINE CO.**, 550 W. Spring St., Columbus 16, Ohio
1—3

KANSAS CITY HAY PRESS CO., 801 Woodswether Road, Kansas City 6, Mo.
1

KEYSTONE DRILLER CO., 8th Ave., Beaver Falls, Pa.
1

LAPLANT-CHOATE MFG. CO., INC., 2920 1st Ave. N. E., Cedar Rapids, Iowa
6

LAWRENCE MACHINE & PUMP CORP., 371 Market St., Lawrence, Mass.
1

MARLOW PUMPS, 568 Greenwood Ave., Ridgewood, N. J.
1

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.
1

•**MORRIS MACHINE WORKS**, Baldwinsville, N. Y.
1—4

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.
1—2

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.
1

MOYO ENGINE CO., 702 Porter St., Lansing 5, Mich.
1—2

OLIVER UNITED FILTERS INC., 33 W. 42nd St., New York 18, N. Y.
1—3—5

PEERLESS PUMP DIV., FOOD MACH'Y & CHEM. CORP., 301 West Ave. 26, Los Angeles 31, Calif.
1—2

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.
1—4

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.
4

STERLING MACHINERY CORP., 411 Southwest Blvd., Kansas City 8, Mo.
1

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
1—2

VICKERS INC., DIV. SPERRY CORP., 1400 Oakman Blvd., Detroit 32, Mich.
6

•**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.
1—3—4

•**A. R. WILFLEY & SONS, INC.**, P. O. Box 2330, Denver 1, Colo.
1—4

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.
1—2—5

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.
1

PYROMETERS

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio

THE BRISTOL CO., Waterbury 20, Conn.

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

THE FOXBORO CO., Neponset Ave., Foxboro, Mass.

•**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

LEEDS & NORTHRUP CO., 4970 Stenton Ave., Philadelphia 44, Pa.

MINNEAPOLIS - HONEYWELL REGULATOR CO., BROWN INSTRUMENTS DIV., Wayne & Windrim Aves., Philadelphia 44, Pa.

PYROMETER INSTRUMENT CO., INC., 92 Portland Ave., Bergenfield, N. J.

TAMMS INDUSTRIES, INC., 228 No. LaSalle St., Chicago 1, Ill.

THWING-ALBERT INSTRUMENT CO., Penn St. & Pulaski Ave., Philadelphia 44, Pa.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

WHEELCO INSTRUMENTS CO., 847 W. Harrison St., Chicago 7, Ill.

R

RACKS, Curing, Concrete Masonry

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

•**BESSER MFG. CO.**, Alpena, Mich.

CAMPION FUEL ENG. DIV., P. O. Box 3941P, Detroit 27, Mich.

THE CHASE FOUNDRY & MFG. CO., 2300 S. Parsons Ave., Columbus 7, Ohio

ROY DARDEN INDUSTRIES, INC., P. O. Box 95, North Side Branch, Atlanta 3, Ga.

•**THE KIRK & BLUM MFG. CO.**, 2838 Spring Grove Ave., Cincinnati 25, Ohio

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.

THE MILES MFG. CO., P. O. Box 65, Jackson, Mich.

•**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio.

•**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.

RAILS, Relay

COMMERCIAL METALS CO., Latimer at Corinth St., Dallas, Texas

L. B. FOSTER CO., P. O. Box 1647, Pittsburgh 30, Pa.

RAILWAY, Industrial Equipment

ATLAS CORPORATION, Mountville, Pa.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

L. B. FOSTER CO., P. O. Box 1647, Pittsburgh 30, Pa.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

RAILWAYS, Electric

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

READY-MIXED CONCRETE PLANTS (see Batching Plants)

READY MIXED TRUCKS (see Bodies, Ready Mixed Concrete)

RECORDERS, Concrete Batching

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

RECORDERS

1. Draft
2. Pressure
3. Temperature

BAILEY METER CO., 1050 Ivanhoe Road, Cleveland 10, Ohio
1—2—3

THE BRISTOL CO., Waterbury 20, Conn.
1—2—3

THE FOXBORO CO., Neponset Ave., Foxboro, Mass.
2—3

THE HAYS CORP., East 8th St., Michigan City, Ind.
1—2

LEEDS & NORTHRUP CO., 4970 Stenton Ave., Philadelphia 44, Pa.
3

MINNEAPOLIS - HONEYWELL REGULATOR CO., BROWN INSTRUMENTS DIV., Wayne & Windrim Aves., Philadelphia 44, Pa.
1—2—3

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.
1—2—3

PYROMETER INSTRUMENT CO., INC., 92 Portland Ave., Bergenfield, N. J.
3

THWING-ALBERT INSTRUMENT CO., Penn St. & Pulaski Ave., Philadelphia 44, Pa.
3

WHEELCO INSTRUMENTS CO., 847 W. Harrison St., Chicago 7, Ill.
3

RECTIFIERS, Electric

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

RECUPERATORS, Waste Heat

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

REFRACTORIES, Block, Brick, Insulation

AMERICAN VERMICULITE CORP., 654 Madison Ave., New York 21, N. Y.

•**THE BABCOCK & WILCOX CO.,** 85 Liberty St., New York 6, N. Y.

BOTFIELD REFRACTORIES CO., Swanson & Clymer Sts., Philadelphia 47, Pa.

THE CARBORUNDUM CO., REFRACTORIES DIV., Perth Amboy, N. J.

THE CARTER-WATERS CORP., 2440 Pennway, Kansas City 8, Mo.

CHICAGO FIRE BRICK CO., 1467 Elston Ave., Chicago 22, Ill.

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.

THE DENVER FIRE CLAY CO., 2301 Blake St., Denver 17, Colo.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

GENERAL REFRACTORIES CO., 1520 Locust St., Philadelphia 2, Pa.

GENERAL REFRACTORIES CO., 405 Atlas Bldg., Salt Lake City 1, Utah

A. P. GREEN FIRE BRICK CO., 1018 E. Breckenridge, Mexico, Mo.

HARBISON - WALKER REFRACTORIES CO., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.

LACLEDE-CHRISTY CO., Iroquois Bldg., 3600 Forbes St., Pittsburgh 13, Pa.

MEXICO REFRACTORIES CO., Better Refractories Bldg., Mexico, Mo.

PUMICE AGGREGATE SALES CORP., 121 S. Yale Ave., Albuquerque, New Mex.

QUIGLEY COMPANY, INC., 527 Fifth Ave., New York 17, N. Y.

RICHARD C. REMMEY SON CO., Hartley St. & Delaware River, Philadelphia 24, Pa.

W. A. RIDDELL CORP., Bucyrus, Ohio

THE RUBEROID CO., 500 Fifth Ave., New York 18, N. Y.

WALSH REFRACTORIES CORP., 101 Ferry St., St. Louis 7, Mo.

REGULATORS, Feed Water

MOSHER ELECTRONIC CONTROLS, 130 W. 42nd St., New York 18, N. Y.

REGULATORS, Draft, Pressure, Temperature (see Controls)

REGULATORS, Voltage

•**ALLIS - CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

RESPIRATORS

THE DeVILBISS CO., 300 Phillips Ave., Toledo 1, Ohio

GENERAL SCIENTIFIC EQUIPMENT CO., 27th & Huntingdon Sts., Philadelphia 32, Pa.

WILLSON PRODUCTS, INC., 248 Washington St., Reading, Pa.

REVOLUTION COUNTERS (see Tachometers)

RHEOSTATS

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

ROCK WOOL CUPOLAS & EQUIPMENT

WHITING CORP., 15693 Lathrop Ave., Harvey, Ill.

RODS, for Grinding Mills

•**THE COLORADO FUEL & IRON CORP.,** P. O. Box 1920, Denver 1, Colo.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

•**HARDINGE CO., INC.,** 240 Arch St., York, Pa.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

RODS, Welding, Hard-facing (see Welding Rods, Hard-facing)

RODS, Welding (see Welding Rods and Electrodes)

ROLLER BEARINGS (see Bearings)

ROOFING AND SIDING, Industrial

THE BARRETT DIV., ALLIED CHEMICAL & DYE CORP., 40 Rector St., New York 6, N. Y.

BASALT ROCK CO., INC., 8th & River Sts., Napa, Calif.

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

JOHNS-MANVILLE, 22 E. 40th St., New York 16, N. Y.

KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19, Pa.

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1, Ohio

THE RUBEROID CO., 500 Fifth Ave., New York 18, N. Y.

•**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.

ROPE, Wire (see Wire Rope)

RUBBER LININGS (see Chute Linings, Rubber)

S

SAFETY EQUIPMENT, Goggles, Shoes, Etc.

AMERICAN OPTICAL CO., Southbridge, Mass.

EDMONT MANUFACTURING CO., 6th & Orange Sts., Coshocton, Ohio

GENERAL SCIENTIFIC EQUIPMENT CO., 27th & Huntingdon Sts., Philadelphia 32, Pa.

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

LEHIGH SAFETY SHOE CO., 31 S. 7th St., Allentown, Pa.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

WILLSON PRODUCTS, INC., 248 Washington St., Reading, Pa.

SAMPLING EQUIPMENT

ACKER DRILL CO., INC., 725 W. Lackawanna Ave., Scranton 3, Pa.

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

THE GALIGHER COMPANY, 545 W. 8th South, Salt Lake City, Utah

•**HARDINGE CO., INC.,** 240 Arch St., York, Pa.

HUMBOLDT MFG. CO., 2014 N. Whipple St., Chicago 47, Ill.

•**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

SAND DRAGS (see Sand Recovery Machinery)

SAND-LIME BRICK MACHINERY (see Brick Machinery)

SAND RECOVERY MACHINERY, Cones, Classifiers, Dewaterers, Drags, Etc.

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.

ALLEN - SHERMAN - HOFF CO., Lewis Tower Bldg., Philadelphia 2, Pa.

ANDERSON ENGINEERING CO., 237 Bent St., Cambridge 41, Mass.

ATLAS CORPORATION, Mountville, Pa.

BIRD MACHINE CO., South Walpole, Mass.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

COLORADO IRON WORKS CO., 1624 17th St., Denver 2, Colo.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

COYLE & ROTH, 3024 4th St., S. E., Minneapolis 14, Minn.

THE DEISTER CONCENTRATOR CO., P. O. Box 1, Fort Wayne 1, Ind.

•**DEISTER MACHINE CO.,** 1933 East Wayne St., Fort Wayne 4, Ind.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

•**THE DORR CO., INC.,** Barry Place, Stamford, Conn.

•**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg., Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

•**HARDINGE CO., INC.,** 240 Arch St., York, Pa.

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

•**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

MILLVILLE IRON WORKS INC., 6th St. & Florence Ave., Millville, N. J.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

•**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.

•**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

•**SIMPLICITY ENGINEERING CO.,** Durand, Mich.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

●**SMITH ENGINEERING WORKS,** 508 E. Capitol Dr., Milwaukee 12, Wis.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

●**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.

●**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

SCALES, Batching (see Batchers)

SCALES, Conveyor (see Feeders)

SCALES, Hopper

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

●**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

JOHN CHATILLON & SONS, 85 to 93 Cliff St., New York 7, N. Y.

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.

MEYER SCALES, INC., 449 Central Ave., Orange, N. J.

NOBLE CO., 1860 Seventh St., Oakland 20, Calif.

RICHARDSON SCALE CO., Van Houton Ave., Clifton, N. J.

STREETER-AMET CO., 4101 N. Ravenswood, Chicago 18, Ill.

TOLEDO SCALE CO., 1090 Telegraph Road, Toledo 12, Ohio

WINSLOW GOVT. STANDARD SCALE CO., 25th & Hawthorne, Terre Haute, Ind.

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.

SCALES, Laboratory

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.

JOHN CHATILLON & SONS, 85 to 93 Cliff St., New York 7, N. Y.

●**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.

FISHER SCIENTIFIC CO., 717 Forbes St., Pittsburgh 19, Pa.

GENERAL SCIENTIFIC EQUIPMENT CO., 27th & Huntingdon Sts., Philadelphia 32, Pa.

HUMBOLDT MFG. CO., 2014 N. Whipple St., Chicago 47, Ill.

TOLEDO SCALE CO., 1090 Telegraph Road, Toledo 12, Ohio

SCALES, Larry (see Weigh Larries)

SCALES, Proportioning (see Batchers)

SCALES, Truck, Railway

●**BONDED SCALE & MACHINE CO.,** 41 Bellview Ave., Columbus 7, Ohio

●**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

FAIRBANKS MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.

MEYER SCALES, INC., 449 Central Ave., Orange, N. J.

TOLEDO SCALE CO., 1090 Telegraph Road, Toledo 12, Ohio

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.

SCRAPERS, Power Drag (see Cable Excavators)

SCRAPERS, Tractor

ALLIED STEEL PRODUCTS, INC., 7835 Broadway, Cleveland 5, Ohio

●**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

●**CATERPILLAR TRACTOR CO.,** Peoria 8, Ill.

THE EUCLID ROAD MCHNRY. CO., 1361 Chardon Road, Cleveland 17, Ohio

THE HEIL CO., 3000 W. Montana St., Milwaukee 1, Wis.

HENNEUSE ENGINEERING CO., Marion, Ohio

LAPLANT - CHOATE MFG. CO. INC., 2920 1st Ave. N. E., Cedar Rapids, Iowa

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

WOOLDRIDGE MANUFACTURING CO., Sunnyvale, Calif.

SCREEN CLOTH, Woven-Wire (see Wire Cloth)

SCREEN PLATE, Perforated

THE ABBEY-SCHERER CO., 304 Railroad St., El Monte, Calif.

●**ALLIS - CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**CHICAGO PERFORATING CO.,** 2445 W. 24th Pl., Chicago 8, Ill.

●**THE COLORADO FUEL & IRON CORP.,** P. O. Box 1920, Denver 1, Colo.

CROSS ENGINEERING CO., Dundaff St., P. O. Box 507, Carbondale, Pa.

●**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

●**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.

●**GRUENDLER CRUSHER & PULVERIZER CO.,** 2920 N. Market St., St. Louis 6, Mo.

HARRINGTON & KING PERFORATING CO., 5655 Fillmore St., Chicago 44, Ill.

●**HENDRICK MFG. CO.,** Carbondale, Pa.

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.

●**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

CHARLES MUNDT & SONS, 53 Fairmount Ave., Jersey City 4, N. J.

●**SIMPLICITY ENGINEERING CO.,** Durand, Mich.

STANDARD STAMPING & PERFORATING CO., 3131 W. 49th Place, Chicago 32, Ill.

●**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

SCREENING PLANTS, Portable (see Crushing and Screening Plants Portable)

SCREENS

1. Gravity
2. Grizzley
3. Laboratory
4. Revolving
5. Scrubber
6. Vibrating & Shaker

ABBE ENGINEERING CO., 50 Church St., New York 7, N. Y.
4

ALLEN CONE & MACHINERY CORP., 120 Broadway, New York 5, N. Y.
6

●**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.
2—3—4—5—6

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio
1—2—3—4—5—6

●**AUSTIN-WESTERN CO.,** Aurora, Ill.
1—2—4—6

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio
4

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.
4—5—6

●**BONDED SCALE & MACHINE CO.,** 41 Bellview Ave., Columbus 7, Ohio
6

CENTRAL SCIENTIFIC CO., 1700 Irving Park Rd., Chicago 13, Ill.
3

●**CHICAGO PERFORATING CO.,** 2445 W. 24th Pl., Chicago 8, Ill.
3—4—5—6

CHICAGO STEEL FOUNDRY CO., 3720 So. Kedzie Ave., Chicago 32, Ill.
6

●**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.
1—2—3—4—5—6

COYLE & ROTH, 3024 4th St. S. E., Minneapolis 14, Minn.
5—6

THE DEISTER CONCENTRATOR CO., P. O. Box 1, Fort Wayne 1, Ind.
6

●**DEISTER MACHINE CO.,** 1933 East Wayne St., Fort Wayne 4, Ind.
6

●**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.
3—6

DIAMOND IRON WORKS, INC., 1728 2nd St. No., Minneapolis 11, Minn.
5—6

●**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.
2—6

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.
2—4

FISHER SCIENTIFIC CO., 717 Forbes St., Pittsburgh 19, Pa.
3

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.
1—2—3—4—5—6

THE GILSON SCREEN CO., 119 E. Market St., Mercer, Pa.
3

●**GRUENDLER CRUSHER & PULVERIZER CO.,** 2920 N. Market St., St. Louis 6, Mo.
1—4—5—6

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.
6

ROBERT HOLMES & BROS. INC., 3519 Junction Ave., Danville, Ill.
6

HUMBOLDT MFG. CO., 2014 N. Whipple St., Chicago 47, Ill.
3

●**IOWA MFG. CO.,** 916 16th St., N.E., Cedar Rapids, Iowa
1—2—4—5—6

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio
2—4—6

●**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.
1—2—4—5—6

●**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.
1—2—3—4—5—6

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.
1—2—4—5—6

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.
1—2—4—5

MILLVILLE IRON WORKS INC., 6th St. & Florence Ave., Millville, N. J.
4

●**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.
2—4—5—6

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.
1—2—4—6

●**NEW HOLLAND MFG. CO.,** Mountville, Pa.
1—2—6

●**NORDBERG MFG. CO.,** 3073 So. Chase Ave., Milwaukee 7, Wis.
2—6

OVERSTROM & SONS, 2213 W. Mission Road, Alhambra, Calif.
3—6

●**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.
2—4—5—6

●**PRASCHAK MACHINE CO.,** Marshfield, Wis.
4

PRODUCTIVE EQUIPMENT CORP., 2926 W. Lake St., Chicago 12, Ill.
1—3—6

W. A. RIDDELL CORP., Bucyrus, Ohio
1—6

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.
6

●**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.
2—4—5

●**SCREEN EQUIPMENT CO., INC.,** Buffalo 21, N. Y.
6

●**SIMPLICITY ENGINEERING CO.,** Durand, Mich.
2—6

●**SMITH ENGINEERING WORKS,** 508 E. Capitol Dr., Milwaukee 12, Wis.
4—6

STAR WIRE SCREEN & IRON WORKS, 2515 San Fernando Rd., Los Angeles 65, Calif.
1—2—3—4—5—6

STEDMAN FOUNDRY & MACHINE WORKS, INC., Indiana Ave., Aurora, Ind.
6

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.
2—4—5—6

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.
2—4—5—6

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.
3—6

●**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.
2—6

●**TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.
4

TRIANGLE ENGINEERING CO., 2848 W. 26th St., Chicago 23, Ill.
6

●**THE W. S. TYLER CO.,** 3615 Superior Ave., Cleveland 14, Ohio
1—2—3—5—6

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
1—2—4—6

●**UNIVERSAL ENGINEERING CORP.,** 625 C Ave. N.W., Cedar Rapids, Iowa
4—5—6

●**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.
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●**UNIVERSAL VIBRATING SCREEN CO.,** Deane Blvd. & St. Paul RR., Racine, Wis.
3—6

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

VIBRO-PLUS PRODUCTS, INC., 54-11 Queens Blvd., Woodside, L. I., N. Y.
6

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
6

•**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.
6

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.
4

SCREW CONVEYORS (see Conveyors, Screw)

SCRUBBERS, Crushed Stone, Gravel

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

•**AUSTIN-WESTERN CO.,** Aurora, Ill.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

•**THE DORR CO., INC.,** Barry Place, Stamford, Conn.

•**EAGLE IRON WORKS,** 137 Holcomb Ave., Des Moines 4, Iowa

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

•**GRUENDLER CRUSHER & PULVERIZER CO.,** 2920 N. Market St., St. Louis 6, Mo.

•**HARDINGE CO., INC.,** 240 Arch St., York, Pa.

•**IOWA MFG. CO.,** 916 16th St. N.E., Cedar Rapids, Iowa

•**KENNEDY VAN SAUN MFG. & ENG. CORP.,** 2 Park Ave., New York 16, N. Y.

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

E. F. MARSH ENG. CO., 4324 W. Clayton Ave., St. Louis 10, Mo.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

•**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.

•**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

•**ROGERS IRON WORKS CO.,** 11th & Pearl Sts., Joplin, Mo.

•**SMITH ENGINEERING WORKS.,** 508 E. Capitol Dr., Milwaukee 12, Wis.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STRAUB MFG. CO., 507 Chestnut St., Oakland 7, Calif.

•**TRAYLOR ENGINEERING & MFG. CO.,** Allentown, Pa.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**UNIVERSAL ENGINEERING CORP.,** 625 C Ave. N.W., Cedar Rapids, Iowa

•**UNIVERSAL ROAD MACHINERY CO.,** 27 Emerick St., Kingston, N. Y.

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.

SEAL RINGS, Kiln

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

•**F. L. SMIDTH & CO.,** 11 W. 42nd St., New York 18, N. Y.

SEPARATORS, Air (see Air Separators)

SEPARATORS, Electrostatic (see Classifiers)

SEPARATORS, Magnetic (see Magnetic Separators)

SHEAVES

1. Wire Rope
2. V. Belt

•**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.
2

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.
1

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio
1

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.
2

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.
1—2

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.
2

THE DAYTON RUBBER CO., Dayton 1, Ohio
2

R. & J. DICK CO., INC., P. O. Box 388, Passaic, N. J.
2

DOBBIE FOUNDRY & MACHINE CO., 146-170 Portage Road, Niagara Falls, N. Y.
1

DODGE MANUFACTURING CORP., Mishawaka, Ind.
2

DOWNS CRANE & HOIST CO., 540 W. Vernon Ave., Los Angeles 37, Calif.
1—2

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.
1—2

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.
1

FARRELL-CHEEK STEEL CO., Sandusky, Ohio
1

•**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.
1

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.
2

ROBERT HOLMES & BROS. INC., 3519 Junction Ave., Danville, Ill.
2

W. A. JONES FOUNDRY & MACHINE CO., 4401 Roosevelt Rd., Chicago 24, Ill.
1—2

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.
1

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.

THE LOOMIS MACHINE CO., 15 E. Market St., Tiffin, Ohio
1

MADESCO TACKLE BLOCK CO., P. O. Box 148, Easton, Pa.
1

THE MEDART CO., 100 Potomac St. St. Louis 18, Mo.
1—2

•**McLANAHAN AND STONE CORP.,** Hollidaysburg, Pa.
2

PYOTT FOUNDRY & MACHINE CO., 328 No. Sangamon St., Chicago 7, Ill.
1—2

•**SAUERMAN BROS., INC.,** 530 S. Clinton St., Chicago 7, Ill.
1

•**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.
1

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.
1—2

•**VULCAN IRON WORKS,** 700 So. Main St., Wilkes-Barre, Pa.
1

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.
1

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.
1—2

SHOVELS, Crawler Mounted

1. Diesel
2. Electric
3. Gasoline
4. Electric Generator

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.
1—2—3

•**AUSTIN-WESTERN CO.,** Aurora, Ill.
1—2—3—4

BAY CITY SHOVELS, INC., Bay City, Mich.
1—2— 3

THE BROWNING CRANE & SHOVEL CO., 16226 Waterloo Road, Cleveland 10, Ohio
1—3

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.
1—2—3—4

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.
1—3

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah
1—2

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.
1

THE HANSON CLUTCH & MACHINERY CO., Wall & Miami Sts., Tiffin 15, Ohio
1—3

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.
1—2—3—4

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.
1—3

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.
1—2—3

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.
1—2—3—4

•**LIMA-HAMILTON CORP.,** South Main St., Lima, Ohio
1—2—3

•**LINK-BELT SPEEDER CORP.,** 1201 Sixth St. S. W., Cedar Rapids, Iowa
1—2—3—4

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.
1—3

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.
1—3

MARION POWER SHOVEL CO., 617 W. Center St., Marion, Ohio
1—2—3—4

MICHIGAN POWER SHOVEL CO., 250 Miller Road, Benton Harbor, Mich.
1—2

•**NORTHWEST ENGINEERING CO.,** 135 S. LaSalle St., Chicago 3, Ill.
1—2—3—4

ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Ill.
1—2—3

•**THE OSGOOD CO.,** Marion, Ohio

•**THE THEW SHOVEL CO.,** 1000 E. 28th St., Lorain, Ohio
1—2—3

TRACTOMOTIVE CORP., County Line Road, Deerfield, Ill.
1

•**UNIT CRANE & SHOVEL CORP.,** 6411 W. Burnham St., Milwaukee 14, Wis.
1—3

WAYNE CRANE DIV. AMERICAN STEEL DREDGE CO., INC., P. O. Box 570, Fort Wayne 1, Ind.
1—3

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.
1—3

SHOVELS, Tractor

ATHEY PRODUCTS CO., 5631 W. 65th St., Chicago 38, Ill.

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.

LESSMANN MANUFACTURING CO., E. 20th & Easton Blvd., Des Moines 4, Iowa

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

MAINE STEEL INC., South Windham, Me.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

THE OLIVER CORP., INDUSTRIAL DIV., 19300 Euclid Ave., Cleveland 17, Ohio

OTTAWA STEEL PRODUCTS CO., Ottawa, Kansas

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

TRACTOMOTIVE CORP., County Line Road, Deerfield, Ill.

SHOVELS, Truck-Mounted

•**ALLIS-CHALMERS MFG. CO., TRACTOR DIVISION,** P. O. Box 512, Milwaukee 1, Wis.

BAY CITY SHOVELS, INC., Bay City, Mich.

•**BUCYRUS-ERIE CO.,** South Milwaukee, Wis.

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

THE HANSON CLUTCH & MACHINERY CO., Wall & Miami Sts., Tiffin 15, Ohio

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.

INSLEY MFG. CORP., 801 N. Olney, Indianapolis 1, Ind.

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.

•**LIMA-HAMILTON CORP.,** South Main St., Lima, Ohio

•**LINK-BELT SPEEDER CORP.,** 1201 Sixth St. S.W., Cedar Rapids, Iowa

MICHIGAN POWER SHOVEL CO., 250 Miller Road, Benton Harbor, Mich.

•**NORTHWEST ENGINEERING CO.,** 135 S. LaSalle St., Chicago 3, Ill.

ORTON CRANE & SHOVEL CO., 608 S. Dearborn St., Chicago 5, Ill.

•**THE OSGOOD CO.,** Marion, Ohio

"QUICK-WAY" TRUCK SHOVEL CO., 4150 Josephine St., Denver 6, Colo.

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•**THE THEW SHOVEL CO.,** 1000 E. 28th St., Lorain, Ohio

•**UNIT CRANE & SHOVEL CORP.,** 6411 W. Burnham St., Milwaukee 14, Wis.

WAYNE CRANE DIV., AMERICAN STEEL DREDGE CO., INC., P. O. Box 570, Fort Wayne 1, Ind.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

SHREDDERS, Plaster

ABBE ENGINEERING CO., 50 Church St., New York 7, N. Y.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**WILLIAMS PATENT CRUSHER & PULV. CO.,** 813 Montgomery St., St. Louis 6, Mo.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

SIEVES, Testing

FISHER SCIENTIFIC CO., 717 Forbes St., Pittsburgh 19, Pa.

HUMBOLDT MFG. CO., 2014 N. Whipple St., Chicago 47, Ill.

STURTEVANT MILL CO., 102 Clayton St., Boston 22, Mass.

●**THE W. S. TYLER CO.**, 3615 Superior Ave., Cleveland 14, Ohio

SILOS, Storage

BIRMINGHAM TANK CO., DIV. OF INGALLS IRON WKS. CO., P. O. Drawer 1490, Birmingham 1, Ala.

CONCRETE SILO CO., P. O. Box 346, Bloomfield, Ind.

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

THE DODSON MFG. CO., 1463 Barwise Ave., Wichita 2, Kans.

●**THE C. S. JOHNSON CO.**, Subsidiary Koehring Co., Champaign, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

THE MARIETTA CONCRETE CORP., Westview, Box 356, Marietta, Ohio

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

NICHOLSON CO., 10 Rockefeller Plaza, New York 20, N. Y.

SINTERING MACHINERY

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

●**KENNEDY VAN SAUN MFG. & ENG. CORP.**, 2 Park Ave., New York 16, N. Y.

NICHOLS ENGINEERING & RESEARCH CORP., 70 Pine St., New York 5, N. Y.

●**SINTERING MACHINERY CORP.**, Netcong, N. J.

●**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

SKIP LOADERS

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

●**BESSER MFG. CO.**, Alpena, Mich.

CONSTRUCTION PRODUCTS CORP., 410 San Fernando Road, Los Angeles 31, Calif.

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.

DES PLAINES CONCRETE PROD. MACHINERY, 930 North Ave., Des Plaines, Ill.

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

●**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

●**STEARNS MFG. CO., INC.**, 600 E. Beecher St., Adrian, Mich.

●**WITTEMANN MACHINERY CO.**, Paynters Road, Farmingdale, N. J.

SKIP HOISTS

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

●**BESSER MFG. CO.**, Alpena, Mich.

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

DEMPSTER BROTHERS, INC., Springdale St., Knoxville 17, Tenn.

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

GALENA MACHINE & ELECTRIC CO., 209-11 Main St., Galena, Kans.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

ROBERT HOLMES & BROS., INC., 3519 Junction Ave., Danville, Ill.

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

MISHCO CORP., 615 SW 2nd Ave., Miami, Fla.

●**MULTIPLEX MACHINERY CORP.**, Elmore, Ohio

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

●**ROGERS IRON WORKS CO.**, 11th & Pearl Sts., Joplin, Mo.

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.

●**STEARNS MFG. CO., INC.**, 600 E. Beecher St., Adrian, Mich.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

SUPERIOR - LIDGERWOOD - MUNDY CORP., 7 Dey St., New York 7, N. Y.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

UNIVERSAL TAMPERS INC., 1530 N. Adams St., Peoria 3, Ill.

●**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.

SLAKERS (see Hydrators, Lime)

SLINGS, Wire Rope (see Wire Rope Slings)

SLUGS, Grinding (see Grinding Media)

SLURRY AGITATORS

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

●**THE DORR CO., INC.**, Barry Place, Stamford, Conn.

THE GALIGHER COMPANY, 545 W. 5th South, Salt Lake City, Utah

●**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

H. K. PORTER CO., INC., 49th & Harrison Sts., Pittsburgh 1, Pa.

W. A. RIDDELL CORP., Bucyrus, Ohio

●**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

●**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

SLURRY FILTERS

●**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

BIRD MACHINE CO., South Walpole, Mass.

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

FILTRATION ENGINEERS INC., 155 Oraton St., Newark 4, N. J.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

OLIVER UNITED FILTERS INC., 33 W. 42nd St., New York 18, N. Y.

SLURRY MIXERS

ABBE ENGINEERING CO., 50 Church St., New York 7, N. Y.

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

●**THE DORR CO., INC.**, Barry Place, Stamford, Conn.

●**THE J. B. EHRSAM & SONS MFG. CO.**, Enterprise, Kans.

●**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

●**KOEHRING CO.**, 3026 W. Concordia Ave., Milwaukee 10, Wis.

●**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

●**THE T. L. SMITH CO.**, 2835 N. 32nd St., Milwaukee 10, Wis.

SLURRY PUMPS (see Pumps, Slurry)

SLURRY SEPARATORS

MERCO CENTRIFUGAL CO., 1045 Sansone St., San Francisco 11, Calif.

●**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

SLURRY THICKENERS

BIRD MACHINE CO., South Walpole, Mass.

CENTRIFUGE MECHANICAL EQPT., INC., 95 River St., Hoboken, N. J.

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

●**DENVER EQUIPMENT CO.**, 1410 Seventeenth St., Denver 17, Colo.

●**THE DORR CO., INC.**, Barry Place, Stamford, Conn.

●**EAGLE IRON WORKS**, 137 Holcomb Ave., Des Moines 4, Iowa

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg. Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

●**HARDINGE CO., INC.**, 240 Arch St., York, Pa.

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

MERCO CENTRIFUGAL CO., 1045 Sansone St., San Francisco 11, Calif.

MORSE BROS. MACHINERY CO., 2900 Brighton Blvd., Denver 1, Colo.

●**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

SOCKETS, Wire Rope (see Wire Rope Fittings)

SPEED REDUCERS (see Drives)

SPOUTS (see Chutes)

SPRAY COOLING SYSTEMS

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.

SPRAYING SYSTEM CO., 3201 Randolph St., Bellwood, Ill.

SPRAYS, Wash Water

THE DEISTER CONCENTRATOR CO., P. O. Box 1, Fort Wayne 1, Ind.

●**DEISTER MACHINE CO.**, 1933 East Wayne St., Fort Wayne 4, Ind.

SPRAYING SYSTEMS CO., 3201 Randolph St., Bellwood, Ill.

SPROCKETS, Chain

AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO., 377 E. 14th St., Chicago Heights, Ill.

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**CHAIN BELT CO.**, 1600 W. Bruce St., Milwaukee 4, Wis.

●**CONTINENTAL GIN CO.**, P. O. Box 2614, Birmingham, Ala.

●**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**IOWA MFG. CO.**, 916 16th St. N.E., Cedar Rapids, Iowa

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.

●**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

MORSE CHAIN CO., 7601 Central Ave., Detroit 8, Mich.

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.

PYOTT FOUNDRY & MACHINE CO., 328 No. Sangamon St., Chicago 7, Ill.

●**TAYLOR-WHARTON IRON & STEEL CO.**, High Bridge, N. J.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

STAIR TREADS & STEPS, Industrial

●**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.

GOODALL RUBBER CO., Whitehead Road, Trenton 4, N. J.

●**HENDRICK MFG. CO.**, Carbondale, Pa.

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

●**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

STARTERS, Motor

●**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

THE ELECTRIC CONTROLLER & MFG. CO., 2700 E. 79th St., Cleveland 4, Ohio

●**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

STEAM-CURING EQUIPMENT, Concrete (see Kilns)

STEEL

1. Abrasion Resisting
2. Bar
3. Concrete Reinforcing
4. Heat-Resisting
5. Manganese
6. Plates & Shapes
7. Shafting
8. Special Alloy

ALLIED STEEL PRODUCTS, INC., 7835 Broadway, Cleveland 5, Ohio
1—2—5—6—7—8

●**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.
1—5—8

AMERICAN STEEL & WIRE CO., Rockefeller Bldg., Cleveland 13, Ohio
3

●**AUTOMATIC SPRING COILING CO.,** 4051 W. Thorndale Ave., Chicago, Ill.
3

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.
1—2—3—4—5—6—7—8

CARNEGIE-ILLINOIS STEEL CORP., 2126 Carnegie Bldg., Pittsburgh 30, Pa.
1—2—3—4—5—6—7—8

THE CARTER-WATERS CORP., 2440 Pennway, Kansas City 8, Mo.
3

CHICAGO STEEL FOUNDRY CO., 3720 So. Kedzie Ave., Chicago 32, Ill.
4

●**THE COLORADO FUEL & IRON CORP.,** P. O. Box 1920, Denver 1, Colo.
2—3—6

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.
1—4—5—8

ELECTRO-ALLOYS DIV., AMERICAN BRAKE SHOE CO., Taylor St. & Abbey Road, Elyria, Ohio
1—4—8

THE FAHRALLOY CO., 149th Loomis St., Harvey, Ill.
4—8

FARRELL-CHEEK STEEL CO., Sandusky, Ohio
1

●**THE FROG, SWITCH & MFG. CO.,** Carlisle, Pa.
1—5

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.
1—2—3—4—5—6—7—8

JONES & LAUGHLIN STEEL CORP., Third Ave. & Ross St., Pittsburgh 30, Pa.
1—2—3—6—7—8

KENSINGTON STEEL CO., 505 Kensington St., Chicago 28, Ill.
8

LACLEDE STEEL CO., Arcade Bldg., St. Louis 1, Mo.
2—3

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.
1—4—5—6—8

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.
1—5—8

REPUBLIC STEEL CORP., Republic Bldg., Cleveland 1, Ohio
1—2—3—4—5—6—7—8

●**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.
1—2—3—4—5—6—7—8

STROH PROCESS STEEL CO., 1428 High St., Pittsburgh 12, Pa.
1

●**STULZ-SICKLES CO.,** 134 Lafayette St., Newark 5, N. J.
2—5—6

●**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.
1—5—8

●**THE TIMKEN ROLLER BEARING CO.,** 1835 Dueber Ave. S.W., Canton 6, Ohio
2—4—8

YUBA MFG. CO., 351 California St., San Francisco 4, Calif.
1—2—5—6—7—8

STOKERS, Coal, for Lime Kilns, Etc.

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio

●**THE BABCOCK & WILCOX CO.,** 85 Liberty St., New York 6, N. Y.

FAIRBANKS, MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.

SUPERIOR - LIDGERWOOD - MUNDY CORP., 7 Dey St., New York 7, N. Y.

STORAGE SYSTEMS, Radial

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

●**SAUERMAN BROS., INC.,** 530 S. Clinton St., Chicago 7, Ill.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STUCCO COLORS (see Cement and Masonry Colors)

SUPERHEATERS (see Boilers)

SWITCHBOARDS AND PANELS

●**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

ALBERT & J. M. ANDERSON MFG. CO., 289-305 A St., Boston 10, Mass.

ELECTRIC MACHINERY MFG. CO., 1331 Tyler St. N.E., Minneapolis 13, Minn.

●**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

INTERNATIONAL DIESEL ELECTRIC CO., INC., 13-02 44th Ave., Long Island City 1, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

SWITCHES, Control, Electric

●**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

ALBERT & J. M. ANDERSON MFG. CO., 289-305 A St., Boston 10, Mass.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

●**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

SWITCHES, Magnetic

●**ALLIS-CHALMERS MFG. CO.,** 975 So. 70th St., Milwaukee 1, Wis.

B. F. M. INDUSTRIES, INC., 2124 Mill Ave., Brooklyn 34, N. Y.

●**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

T

TABLES, Washing, Concentrating (see Concentrating Tables)

TACHOMETERS, Counters, Etc.

THE BRISTOL CO., Waterbury 20, Conn.

●**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

RELIANCE ELECTRIC & ENGINEERING CO., 1088 Ivanhoe Rd., Cleveland 10, Ohio

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

TANKS, Gasoline

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

BIRMINGHAM TANK CO., DIV. OF INGALLS IRON WKS. CO., P. O. Drawer 1490, Birmingham 1, Ala.

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg. Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

THE HEIL CO., 3000 W. Montana St., Milwaukee 1, Wis.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

TANKS, Sand Settling (see Sand Recovery Machinery)

TANKS, Storage, Concrete

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

●**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

●**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

THE NEFF & FRY CO., 150 S. Main St., Camden, Ohio

TANKS, Storage, Steel

ALPHA TANK & SHEET METAL MFG. CO., 5001 So. 38th St., St. Louis 16, Mo.

ARNOLD & WEIGEL DIV., TOLEDO ENGINEERING CO., INC., 958 Wall St., Toledo 6, Ohio

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

BIRMINGHAM TANK CO., DIV. OF INGALLS IRON WKS. CO., P. O. Drawer 1490, Birmingham 1, Ala.

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

●**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

●**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

GENERAL AMERICAN TRANSPORTATION CORP., Field Bldg. Room 3105, 135 So. LaSalle St., Chicago 90, Ill.

GENERAL CONVEYOR & MFG. CO., 3601 Salena St., St. Louis 18, Mo.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

IRVINGTON FORM & TANK CORP., 43 Cedar St., New York 5, N. Y.

●**THE KIRK & BLUM MFG. CO.,** 2838 Spring Grove Ave., Cincinnati 25, Ohio

LANDIS STEEL CO., 116 W. A St., Picher, Okla.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

SOUTHWEST WELDING & MFG. CO., 3201 W. Mission Road, Alhambra, Calif.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

WM. BROS. BOILER & MFG. CO., 1057 10th Ave. S.E., Minneapolis 14, Minn.

TESTING LABORATORIES (see Laboratories)

TESTING EQUIPMENT (see Laboratory Apparatus)

THERMOCOUPLES, Pyrometers (see Pyrometers)

THICKENERS (see Slurry Thickeners)

THIRD AXLES (see Motor Truck Drives & Differentials)

TIRES, Coolers, Dryers, Kiln

●**THE GOODYEAR TIRE & RUBBER CO., INC.,** 1144 E. Market St., Akron 16, Ohio

●**HARDINGE CO., INC.,** 240 Arch St., York, Pa.

JAMES C. HEINTZ & CO., INC., W. 143rd at Lorain Ave., Cleveland 11, Ohio

● A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

LUKENS STEEL CO., 521 Lukens Bldg., Coatesville, Pa.

•**F. L. SMIDTH & CO.**, 11 W. 42nd St., New York 18, N. Y.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

•**VULCAN IRON WORKS**, 700 So. Main St., Wilkes-Barre, Pa.

TIRES AND TUBES, Rubber, Heavy Duty Industrial

THE DAYTON RUBBER CO., Dayton 1, Ohio

THE FIRESTONE TIRE & RUBBER CO., 1200 Firestone Pkway, Akron 17, Ohio

THE GATES RUBBER CO., 999 S. Broadway, Denver 17, Colo.

THE GENERAL TIRE & RUBBER CO., 1708 Englewood Ave., Akron 9, Ohio

•**B. F. GOODRICH CO.**, Akron 11, Ohio

•**THE GOODYEAR TIRE AND RUBBER CO., INC.**, 1144 E. Market St., Akron 16, Ohio

SEIBERLING RUBBER CO., Akron 9, Ohio

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

TORCHES, Cutting and Welding (see Welding & Cutting Equipment, Oxyacetylene)

TOWERS, Structural Steel

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

•**BLAW-KNOX CO.**, Farmers Bank Bldg., Pittsburgh 22, Pa.

THE INGALLS IRON WORKS CO., P. O. Drawer 2632, Birmingham 2, Ala.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

MIXERMOBILE MANUFACTURERS, 6855 N. E. Halsey St., P. O. Box 5108, Portland 16, Ore.

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.

TRACK & TRACK EQUIPMENT

ALLIED STEEL PRODUCTS, INC., 7835 Broadway, Cleveland 5, Ohio

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.

•**CATERPILLAR TRACTOR CO.**, Peoria 8, Ill.

L. B. FOSTER CO., P. O. Box 1647, Pittsburgh 30, Pa.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

•**JOSEPH T. RYERSON & SON, INC.**, 2558 West 16th St., Chicago 8, Ill.

•**TAYLOR-WHARTON IRON & STEEL CO.**, High Bridge, N. J.

TRACTORS, Industrial Crawler

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

•**ALLIS-CHALMERS MFG. CO., TRACTOR DIVISION**, P. O. Box 512, Milwaukee 1, Wis.

•**CATERPILLAR TRACTOR CO.**, Peoria 8, Ill.

HENNEUSE ENGINEERING CO., Marion, Ohio

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

•**INTERNATIONAL HARVESTER CO.**, 180 N. Michigan Ave., Chicago 1, Ill.

LEWIS-SHEPARD PRODUCTS INC., 206 Walnut St., Watertown 72, Mass.

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

M-R-S MANUFACTURING CO., P. O. Box 336, Flora, Miss.

THE OLIVER CORP., INDUSTRIAL DIV., 19300 Euclid Ave., Cleveland 17, Ohio

•**WESTERN MACHINERY CO.**, 760-766 Folsom St., San Francisco 7, Calif.

TRAILER BODIES (see Bodies)

TRAILER BODIES, Bulk Cement (see Bodies)

TRAILERS & SEMI-TRAILERS, Motor Truck

ATHEY PRODUCTS CO., 5631 W. 65th St., Chicago 38, Ill.

DART TRUCK CO., Oak at 27th Sts., Kansas City 8, Mo.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

THE EUCLID ROAD MCHNRY. CO., 1361 Chardon Road, Cleveland 17, Ohio

•**FORD MOTOR CO.**, Administration Bldg., Dearborn, Mich.

FRUEHAUF TRAILER CO., 10940 Harper Ave., Detroit 32, Mich.

THE HANSON CLUTCH & MACHINERY CO., Wall & Miami Sts., Tiffin 15, Ohio

M-R-S MANUFACTURING CO., P. O. Box 336, Flora, Miss.

McCABE-POWERS AUTO BODY CO., 5900 N. Broadway, St. Louis 15, Mo.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

WINCH-LIFT INC., 317 First National Bank, Shreveport, La.

TRAMWAYS, Aerial (see Aerial Tramways)

TRANSFORMERS, Electric

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

•**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

WAGNER ELECTRIC CORP., 6400 Plymouth Ave., St. Louis 14, Mo.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

TRANSIT CONCRETE MIXING PLANTS (see Central Mixing Plants)

TRANSMISSION MACHINERY (see Gears)

TRIPPERS, Belt (see Conveyor Belt Trippers)

TROLLEYS, I-Beam

CHISHOLM-MOORE HOIST CORP., Fremont Ave., Tonawanda, N. Y.

CURTIS PNEUMATIC MACHINERY CO., 1988 Kienlen Ave., St. Louis 20, Mo.

•**LINK-BELT CO.**, 300 W. Pershing Road, Chicago 9, Ill.

WHITING CORP., 15693 Lathrop Ave., Harvey, Ill.

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.

TRUCK BODIES (see Bodies)

TRUCKS, Dump (see Motor Trucks)

TRUCKS, Hand

BARRET-CRAVENS CO., 4629 S. Western Ave., Chicago 9, Ill.

THE CHASE FOUNDRY & MFG. CO., 2300 S. Parsons Ave., Columbus 7, Ohio

LEWIS-SHEPARD PRODUCTS INC., 206 Walnut St., Watertown 72, Mass.

LIFT TRUCKS, INC., 2425 Spring Grove Ave., Cincinnati 14, Ohio

SERVICE CASTER & TRUCK CORP., 500 N. Brownswood Ave., Albion, Mich.

TRUCKS & TRACTORS, Wheeled Industrial

1. Electric
2. Gas

AUTOMATIC TRANSPORTATION CO., 101 W. 87th St., Chicago 20, Ill.
2

BAKER INDUSTRIAL TRUCK DIV., THE BAKER-RAULANG Co., 1250 W. 80th St., Cleveland 2, Ohio
1

BARRET-CRAVENS CO., 4629 S. Western Ave., Chicago 9, Ill.
1

BELL AIRCRAFT CORP., PRIME MOVER DIV., P. O. Box 1, Buffalo 5, N. Y.
2

THE BUDA COMPANY, 154th & Commercial, Harvey, Ill.
2

J. I. CASE CO., 700 State St., Racine, Wis.
2

•**CLARK EQUIPMENT CO., INDUSTRIAL TRUCK DIV.**, Springfield Pl., Battle Creek, Mich.
1—2

EASTON CAR & CONSTRUCTION CO., Easton, Pa.
1

THE ELWELL-PARKER ELEC. CO., 4205 St. Clair Ave., Cleveland 14, Ohio
1—2

GAR-BRO MFG. CO., 2416 E. 16th St., Los Angeles 21, Calif.

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.
2

HYSTER CO., 2902 N. E. Clackamas, Portland 8, Ore.
2

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.
2

LEWIS-SHEPARD PRODUCTS INC., 206 Walnut St., Watertown 72, Mass.
1—2

LIFT TRUCKS, INC., 2425 Spring Grove Ave., Cincinnati 14, Ohio
1

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.
2

MINNEAPOLIS-MOLINE CO., P. O. Box 1050, Minneapolis 1, Minn.
2

THE OLIVER CORP., INDUSTRIAL DIV., 19300 Euclid Ave., Cleveland 17, Ohio
2

R. H. SHEPPARD CO. INC., Hanover, Pa.
1

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.
1—2

TRUCKS, Lift (see Lift Trucks)

TRUCKS, Motor (see Motor Trucks)

TURBINES, Steam

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

DE LAVAL STEAM TURBINE CO., Trenton 2, N. J.

•**GENERAL ELECTRIC CO.**, 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

•**WORTHINGTON PUMP & MACHINERY CORP.**, Worthington Ave., Harrison, N. J.

TURBINES, Water

•**ALLIS-CHALMERS MFG. CO.**, 975 So. 70th St., Milwaukee 1, Wis.

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia 42, Pa.

TURNTABLES, Track

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

PRESSED STEEL CAR CO., 2505 Grant Bldg., Pittsburgh, Pa.

UNITED IRON WORKS CO., 108 No. Locust, Pittsburg, Kans.

WHITING CORP., 15693 Lathrop Ave., Harvey, Ill.

U

UNLOADERS, Boat

•**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.**, 270 Passaic Ave., Passaic, N. J.

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

MANITOWOC ENGINEERING WORKS, Manitowoc, Wis.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

THE WELLMAN ENGINEERING CO., 7000 Central Ave., Cleveland 4, Ohio

UNLOADERS, Box Car

•**BUTLER BIN CO.**, Box 407, Waukesha, Wis.

•**THE CONVEYOR CO.**, 3260 East Slauson Ave., Los Angeles 11, Calif.

THE EIMCO CORP., P. O. Box 300, Salt Lake City 8, Utah

•**GEORGE HAISS MFG. CO.**, Park Ave. & 143rd St., New York 51, N. Y.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

THE FRANK G. HOUGH CO., Sunnyside Ave., Libertyville, Ill.

•**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

•**JOY MANUFACTURING CO.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.

•**THE KENT MACHINE CO.,** 1931 Thomas St., Cuyahoga Falls, Ohio

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

LULL MFG. CO., 3612 E. 44th St., Minneapolis 6, Minn.

•**PETTIBONE MULLIKEN CORP.,** 4710 W. Division St., Chicago 51, Ill.

STEARNS MAGNETIC MFG. CO., 675 S. 28th St., Milwaukee 4, Wis.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

TRACTOMOTIVE CORP., County Line Road, Deerfield, Ill.

TROWBRIDGE CONVEYOR CO., 851 Van Houten Ave., Clifton, N. J.

UNLOADERS, Pneumatic

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.

R. CONRADER CO., 1209 French St., Erie, Pa.

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

UNLOADERS, Hopper Car

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

V

VACUUM CLEANING SYSTEMS

JAMES H. MARKLEY, 80 Snyder Road, Ramsey, N. J.

VALVES, Air

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.

R. CONRADER CO., 1209 French St., Erie, Pa.

CURTIS PNEUMATIC MACHINERY CO., 1985 Kienlen Ave., St. Louis 20, Mo.

DIXON VALVE & COUPLING CO., Hancock & Columbia Ave., Philadelphia 2, Pa.

THE FOXBORO CO., Neponset Ave., Foxboro, Mass.

KNOX MFG. CO., 226 W. Clinton Ave., Oaklyn, N. J.

R-PDC VALVE DIV. AMERICAN CHAIN & CABLE CO., INC., Reading, Pa.

WALWORTH CO., 60 East 42nd St., New York 17, N. Y.

VALVES, Automatic

AUTOMATIC LIQUID METER CO., 1372-1378 E. 15th St., Los Angeles 21, Calif.

THE BRISTOL CO., Waterbury 20, Conn.

R. CONRADER CO., 1209 French St., Erie, Pa.

THE CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.

THE FOXBORO CO., Neponset Ave., Foxboro, Mass.

•**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.

STAPLES & PFEIFFER, 528 Bryant St., San Francisco 7, Calif.

VALVES, Bin

BODINSON MFG. CO., 2401 Bayshore Blvd., San Francisco 24, Calif.

•**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

•**THE C. S. JOHNSON CO.,** Subsidiary Koehring Co., Champaign, Ill.

MECKUM ENGINEERING, INC., Dayton Rd., Ottawa, Ill.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

VALVES, Pulverized Material

BLOWER APPLICATION CO., 3165 N. 30th St., Milwaukee 10, Wis.

•**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

•**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

VALVES, Slurry

•**FULLER COMPANY,** Fuller Bldg., Catasauqua, Pa.

HILLS-McCANNA CO., 2349 Nelson St., Chicago 18, Ill.

•**THE MINE & SMELTER SUPPLY CO.,** 1422 17th St., Denver 17, Colo.

VALVES, Water

THE CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

THE FLORI PIPE CO., 601-29 E. Red Bud Ave., St. Louis 15, Mo.

HILLS-McCANNA CO., 2349 Nelson St., Chicago 18, Ill.

JACUZZI BROS. INC., 5327 Jacuzzi Ave., Richmond, Calif.

JENKINS BROTHERS, 80 White St., New York 13, N. Y.

KNOX MFG. CO., 226 W. Clinton Ave., Oaklyn, N. J.

LAPLANT-CHOATE MFG. CO. INC., 2920 1st Ave. N. E., Cedar Rapids, Iowa

McNALLY-PITTSBURG MFG. CORP., Pittsburg, Kans.

R-PDC VALVE DIV., AMERICAN CHAIN & CABLE CO., INC., Reading, Pa.

WALWORTH CO., 60 East 42nd St., New York 17, N. Y.

•**WORTHINGTON PUMP & MACHINERY CORP.,** Worthington Ave., Harrison, N. J.

VIBRATING SCREENS (see Screens, Vibrating)

VIBRATORS for Chutes, Bins, Etc.

•**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

•**CHICAGO PERFORATING CO.,** 2445 W. 24th Pl., Chicago 8, Ill.

THE CLEVELAND VIBRATOR CO., 2628 Clinton Ave., Cleveland 13, Ohio

•**CONTINENTAL GIN CO.,** P. O. Box 2614, Birmingham, Ala.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

•**NEW HAVEN VIBRATOR CO.,** 131 Chestnut St., New Haven 7, Conn.

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.

•**THE W. S. TYLER CO.,** 3615 Superior Ave., Cleveland 14, Ohio

VIBRO-PLUS PRODUCTS, INC., 54-11 Queens Blvd., Woodside, L. I., N. Y.

VIBRATORS, Concrete Block

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.

•**BESSER MFG. CO.,** Alpena, Mich.

THE CLEVELAND VIBRATOR CO., 2828 Clinton Ave., Cleveland 13, Ohio

FLEMING MFG. CO., 4985 Fyler Ave., St. Louis, Mo.

•**GENERAL ENGINES CO.,** 307 Hunter St., Gloucester, N. J.

LIFETIME BUILDING SPECIALTIES INC., 519 Brook Haven Dr., Orlando, Fla.

•**NEW HAVEN VIBRATOR CO.,** 131 Chestnut St., New Haven 7, Conn.

THE GENE OLSEN CORP., 401 Grace St., Adrian, Mich.

•**OSWALD ENGINEERING SERVICE CORP.,** 1335 Circle Ave., Forest Park, Ill.

SOUTHEAST STEEL SALES CO., 437 N. Garland St., Orlando, Fla.

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.

VIBRO-PLUS PRODUCTS, INC., 54-11 Queens Blvd., Woodside, L. I., N. Y.

VIBRATORS, Portable Concrete

•**CHICAGO PNEUMATIC TOOL CO.,** 6 E. 44th St., New York 17, N. Y.

HENNEUSE ENGINEERING CO., Marion, Ohio

•**MULTIPLEX MACHINERY CORP.,** Elmore, Ohio

•**NEW HAVEN VIBRATOR CO.,** 131 Chestnut St., New Haven 7, Conn.

STOW MANUFACTURING CO., 49 Shear St., Binghamton, N. Y.

•**SYNTRON CO.,** 450 Lexington Ave., Homer City, Pa.

•**THE W. S. TYLER CO.,** 3615 Superior Ave., Cleveland 14, Ohio

VIBRO-PLUS PRODUCTS, INC., 54-11 Queens Blvd., Woodside, L. I., N. Y.

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

VOLTMETERS

THE BRISTOL CO., Waterbury 20, Conn.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

W

WAGONS, Dump

ATHEY PRODUCTS CO., 5631 W. 65th St., Chicago 38, Ill.

•**CATERPILLAR TRACTOR CO.,** Peoria 8, Ill.

EASTON CAR & CONSTRUCTION CO., Easton, Pa.

•**KOEHRING CO.,** 3026 W. Concordia Ave., Milwaukee 10, Wis.

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.

WOODRIDGE MANUFACTURING CO., Sunnyvale, Calif.

WASHERS, Sand, Gravel, Stone (see Scrubbers)

WEIGH LARRIES

ANCHOR CONCRETE MACHINERY CO., 1191 Fairview Ave., Columbus 12, Ohio

THE C. O. BARTLETT AND SNOW CO., 6200 Harvard Ave., Cleveland 5, Ohio

•**BUTLER BIN CO.,** Box 407, Waukesha, Wis.

•**CHAIN BELT CO.,** 1600 W. Bruce St., Milwaukee 4, Wis.

DIFFERENTIAL STEEL CAR CO., Findlay, Ohio

•**THE J. B. EHRSAM & SONS MFG. CO.,** Enterprise, Kans.

THE HELTZEL STEEL FORM AND IRON CO., 1750 Thomas Road, Warren, Ohio

THE JEFFREY MFG. CO., 935 N. 4th St., Columbus 16, Ohio

•**LINK-BELT CO.,** 300 W. Pershing Road, Chicago 9, Ill.

LIPPMANN ENGINEERING WORKS, 4603 W. Mitchell St., Milwaukee 14, Wis.

MEYER SCALES, INC., 449 Central Ave., Orange, N. J.

•**RICHARDSON SCALE CO.,** Van Houten Ave., Clifton, N. J.

STEPHENS-ADAMSON MFG. CO., 7 Ridgeway Ave., Aurora, Ill.

STREETER-AMET CO., 4101 N. Ravenswood, Chicago 18, Ill.

TOLEDO SCALE CO., 1090 Telegraph Road, Toledo 12, Ohio

THE YALE & TOWNE MFG. CO., Philadelphia 15, Pa.

WEIGHT RECORDERS

THE BRISTOL CO., Waterbury 20, Conn.

BUILDERS-PROVIDENCE, INC., 9 Codding St., Providence 1, R. I.

•**THE CONVEYOR CO.,** 3260 East Slauson Ave., Los Angeles 11, Calif.

THE FOXBORO CO., Neponset Ave., Foxboro, Mass.

WELDING & CUTTING EQUIPMENT, Oxyacetylene

AIR REDUCTION SALES CO., 60 E. 42nd St., New York 17, N. Y.

GENERAL SCIENTIFIC EQUIPMENT CO., 17th & Huntingdon Sts., Philadelphia 32, Pa.

WELDING MACHINES, Arc

AIR REDUCTION SALES CO., 60 E. 42nd St., New York 17, N. Y.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.

HOBART BROTHERS CO., Hobart Square, Troy, Ohio

METAL & THERMIT CORP., 120 Broadway, New York 5, N. Y.

• A dot before name indicates advertiser in this issue. See advertiser index.

DIRECTORY

STERLING MACHINERY CORP., 411 Southwest Blvd., Kansas City 5, Mo.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

WELDING RODS & ELECTRODES

AIR REDUCTION SALES CO., 60 E. 42nd St., New York 17, N. Y.

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

EUTECTIC WELDING ALLOYS, 40 Worth St., New York, N. Y.

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.

HOBART BROTHERS CO., Hobart Square, Troy, Ohio

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

METAL & THERMIT CORP., 120 Broadway, New York 5, N. Y.

PAGE STEEL AND WIRE DIV. AMERICAN CHAIN & CABLE CO., INC., Monessen, Pa.

•**RESISTO-LOY CO.,** 127 Baylis St., S. W., Grand Rapids 7, Mich.

•**STULZ-SICKLES CO.,** 134 Lafayette St., Newark 5, N. J.

•**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.

WALL COLMONOY CORP., 19345 John R. St., Detroit 3, Mich.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

WELDING RODS, Hard Facing

AIR REDUCTION SALES CO., 60 E. 42nd St., New York 17, N. Y.

•**AMERICAN MANGANESE STEEL DIV. OF AMERICAN BRAKE SHOE CO.,** 377 E. 14th St., Chicago Heights, Ill.

BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley 10, N. J.

COAST METALS, INC., 1232 Camden Ave. S. W., Canton 6, Ohio

•**GENERAL ELECTRIC CO.,** 1 River Road, Schenectady 5, N. Y.

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.

HOBART BROTHERS CO., Hobart Square, Troy, Ohio

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

METAL & THERMIT CORP., 120 Broadway, New York 5, N. Y.

PAGE STEEL AND WIRE DIV. AMERICAN CHAIN & CABLE CO., INC., Monessen, Pa.

•**RESISTO-LOY CO.,** 127 Baylis St., S. W., Grand Rapids 7, Mich.

•**STOODY COMPANY,** Whittier, Calif.

•**STULZ-SICKLES CO.,** 134 Lafayette st., Newark 5, N. J.

•**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.

WALL COLMONOY CORP., 19345 John R. St., Detroit 3, Mich.

WESTINGHOUSE ELECTRIC CO., First Nat'l Bank Bldg., Pittsburgh, Pa.

WELDING SUPPLIES & ACCESSORIES

AIR REDUCTION SALES CO., 60 E. 42nd St., New York 17, N. Y.

ALBERT & J. M. ANDERSON MFG. CO., 289-305 A St., Boston 10, Mass.

GENERAL SCIENTIFIC EQUIPMENT CO., 27th & Huntingdon Sts., Philadelphia 32, Pa.

•**HARNISCHFEGER CORP.,** 4400 W. National Ave., Milwaukee 14, Wis.

HOBART BROTHERS CO., Hobart Square, Troy, Ohio

METAL & THERMIT CORP., 120 Broadway, New York 5, N. Y.

WILLSON PRODUCTS, INC., 248 Washington St., Reading, Pa.

WET PANS, Grinding (see Pans, Grinding)

WHEELS, Abrasive

CARBOLOY CO., INC., 11177 E. Eight Mile Rd., Detroit 32, Mich.

THE CARBORUNDUM CO., REFRACTORIES DIV., Perth Amboy, N. J.

RAYBESTOS - MANHATTAN, INC., 61 Willett St., Passaic, N. J.

UNITED STATES RUBBER CO., 1230 Ave. of the Americas, New York 20, N. Y.

WHEELS, Tracklaying Type

ATHEY PRODUCTS CO., 5631 W. 65th St., Chicago 38, Ill.

HENNEUSE ENGINEERING CO., Marion, Ohio

THE OLIVER CORP., INDUSTRIAL DIV., 19300 Euclid Ave., Cleveland 17, Ohio

WHIRLEYS

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

CLYDE IRON WORKS, INC., P. O. Box 370, Duluth 1, Minn.

WINCHES (see Capstans)

WIRE & CABLE, Electric (see Cable, Electric)

WIRE CLOTH

THE ABBEY-SCHERER CO., 304 Railroad St., El Monte, Calif.

BIXBY-ZIMMER CO., 961 Abingdon St., Galesburg, Ill.

THE CAMBRIDGE WIRE CLOTH CO., Good Will Road, Cambridge, Md.

•**THE CLEVELAND WIRE CLOTH & MFG. CO.,** 3573 E. 78th St., Cleveland 5, Ohio

•**THE COLORADO FUEL & IRON CORP.,** P. O. Box 1920, Denver 1, Colo.

•**DENVER EQUIPMENT CO.,** 1410 Seventeenth St., Denver 17, Colo.

•**ROBINS CONVEYORS DIV., HEWITT-ROBINS, INC.,** 270 Passaic Ave., Passaic, N. J.

•**IOWA MFG. CO.,** 916 16th St., N. E., Cedar Rapids, Iowa

KORB-PETTIT WIRE FABRICS & IRON WORKS, INC., 1505-15 N. Mascher St., Philadelphia 22, Pa.

LUDLOW-SAYLOR WIRE CO., 600 S. Newstead Ave., St. Louis 10, Mo.

MANGANESE STEEL FORGE CO., Richmond St. & Castor Ave., Philadelphia 34, Pa.

NATIONAL WIRE CLOTH CO., 252 W. Fairfield Ave., St. Paul 1, Minn.

OVERSTROM & SONS, 2213 W. Mission Road, Alhambra, Calif.

•**PIONEER ENG. WORKS, INC.,** 1515 Central Ave., Minneapolis 13, Minn.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

•**SIMPLICITY ENGINEERING CO.,** Durand, Mich.

STAR WIRE SCREEN & IRON WORKS, 2515 San Fernando Rd., Los Angeles 65, Calif.

•**TAYLOR-WHARTON IRON & STEEL CO.,** High Bridge, N. J.

TWIN CITY IRON & WIRE CO., 21-35 W. Water St., St. Paul 1, Minn.

•**THE W. S. TYLER CO.,** 3615 Superior Ave., Cleveland 14, Ohio

•**WICKWIRE SPENCER STEEL DIV., THE COLORADO FUEL & IRON CORP.,** 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE

AMERICAN CABLE DIV. AMERICAN CHAIN & CABLE CO., INC., Wilkes-Barre, Pa.

AMERICAN STEEL & WIRE CO., Rockefeller Bldg., Cleveland 13, Ohio

BETHLEHEM STEEL CO., E Third St., Bethlehem, Pa.

BRODERICK & BASCOM ROPE CO., 4203 N. Union Blvd., St. Louis 15, Mo.

•**THE COLORADO FUEL & IRON CORP.,** P. O. Box 1920, Denver 1, Colo.

L. B. FOSTER CO., P. O. Box 1647, Pittsburgh 30, Pa.

HAZARD WIRE ROPE DIV., AMERICAN CHAIN & CABLE CO., INC., Wilkes-Barre, Pa.

JONES & LAUGHLIN STEEL CORP., Third Ave. & Ross St., Pittsburgh 30, Pa.

•**A. LESCHEN & SONS ROPE CO.,** 5909 Kennerly Ave., St. Louis 12, Mo.

R. G. LeTOURNEAU, INC., 2301 N. Adams St., Peoria, Ill.

•**MACWHYTE CO.,** 2949 14th Ave., Kenosha, Wis.

ROCHESTER ROPES INC., Culpeper, Va.

JOHN A. ROEBLING'S SONS CO., 640 S. Broad St., Trenton 2, N. J.

•**JOSEPH T. RYERSON & SON, INC.,** 2558 West 16th St., Chicago 8, Ill.

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THE UPSON-WALTON CO., Perry Payne Bldg., Cleveland 13, Ohio

•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

•**WICKWIRE SPENCER STEEL DIV., THE COLORADO FUEL & IRON CORP.,** 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE CORP. OF AMERICA, INC., 464 Congress Ave., New Haven, Conn.

WIRE ROPE FITTINGS, Clamps, Clips, Cutters, Hooks, Sockets, Etc.

AMERICAN CABLE DIV. AMERICAN CHAIN & CABLE CO., INC., Wilkes-Barre, Pa.

AMERICAN HOIST & DERRICK CO., 63 S. Robert St., St. Paul 1, Minn.

AMERICAN STEEL & WIRE CO., Rockefeller Bldg., Cleveland 13, Ohio

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

BRODERICK & BASCOM ROPE CO., 4203 N. Union Blvd., St. Louis 15, Mo.

CHICAGO STEEL FOUNDRY CO., 3720 So. Kedzie Ave., Chicago 32, Ill.

•**THE COLORADO FUEL & IRON CORP.,** P. O. Box 1920, Denver 1, Colo.

DOWNS CRANE & HOIST CO., 540 W. Vernon Ave., Los Angeles 37, Calif.

ELECTRIC STEEL FOUNDRY CO., 2141 N. W. 25th Ave., Portland 10, Ore.

FARRELL - CHEEK STEEL CO., Sandusky, Ohio

HAZARD WIRE ROPE DIV., AMERICAN CHAIN & CABLE CO., INC., Wilkes-Barre, Pa.

JONES & LAUGHLIN STEEL CORP., Third Ave. & Ross St., Pittsburgh 30, Pa.

THE THOMAS LAUGHLIN CO., 143 Fore St., Portland 6, Me.

THE LOOMIS MACHINE CO., 15 E. Market St., Tiffin, Ohio

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MONTGOMERY & CO., INC., 53 Park Place, New York 7, N. Y.

MORSE - STARRETT PRODUCTS CO., 1204 Forty-Ninth Ave., Oakland 1, Calif.

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•**WESTERN MACHINERY CO.,** 760-766 Folsom St., San Francisco 7, Calif.

•**WICKWIRE SPENCER STEEL DIV., THE COLORADO FUEL & IRON CORP.,** 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE CORP. OF AMERICA, INC., 464 Congress Ave., New Haven, Conn.

WIRE ROPE DRESSING COMPOUNDS (see Lubricants)

WIRE ROPE, Slings

AMERICAN CHAIN & CABLE CO., INC., Wilkes-Barre, Pa.

AMERICAN STEEL & WIRE CO., Rockefeller Bldg., Cleveland 13, Ohio

BETHLEHEM STEEL CO., E. Third St., Bethlehem, Pa.

BRODERICK & BASCOM ROPE CO., 4203 N. Union Blvd., St. Louis 15, Mo.

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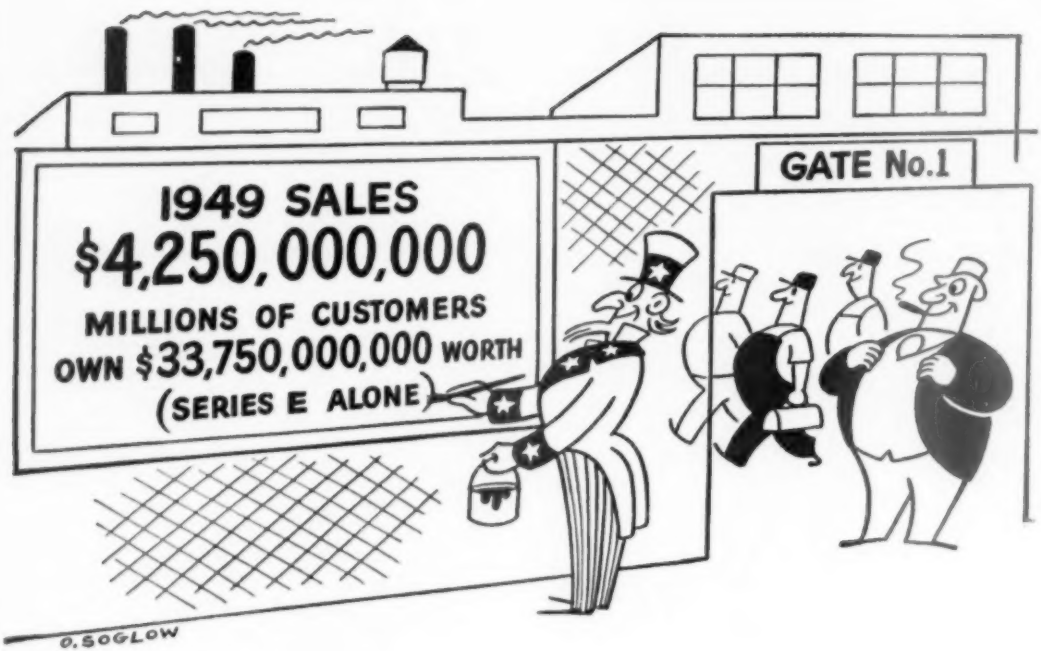
WIRE ROPE CORP. OF AMERICA, INC., 464 Congress Ave., New Haven, Conn.

• A dot before name indicates advertiser in this issue. See advertiser index.



SAVINGS BONDS BUSINESS IS GOOD

and is good for business!

Your company benefits both directly and indirectly as you boost sales of U. S. Savings Bonds through the Payroll Savings Plan.

Direct benefits include decreases in absenteeism, labor turnover, and accidents—with a corresponding increase in production. How come? It's an intangible process *but one that has been demonstrated in more than 20,000 companies operating the plan.* Workers who invest regularly in Savings Bonds—the easy, automatic Payroll Savings way—become better workers. They feel more secure . . . are steadier and more careful in their work.

Indirect benefits accrue from the effect of Bond sales on the national economy—on which, of course, the future of all companies depends. That future becomes more secure because Bond dollars add up to a tremendous backlog of purchasing power—money that will buy *your* products or services in the years to come. What's more, Bond sales improve the equilibrium of our economy by spreading the national debt.

The experience of companies throughout the nation indicates that at least half of your employees can be persuaded to join Payroll Savings—without high-pressure selling. (The nation's biggest advertising program—built with *donated* space, time and services—is creating universal awareness that Savings Bonds pay $4 for $3 when they mature.)

HELP BUILD SECURITY—
TAKE THESE STEPS IN YOUR COMPANY

1. See that top management sponsors the Plan.
2. Secure the help of the employee organizations in promoting it.
3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.
4. Make a person-to-person canvass once a year, to sign up participants.
5. Urge each new employee, at the time he is hired, to sign up.

For all the help you need, get in touch with your State Director, U. S. Treasury Department, Savings Bonds Division—or write the Savings Bonds Division, Treasury Department, Washington, D. C.

The Treasury Department acknowledges with appreciation the publication of this message by

ROCK PRODUCTS

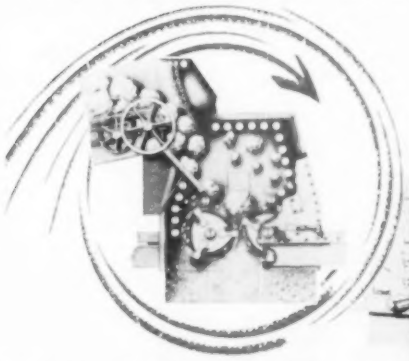
This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

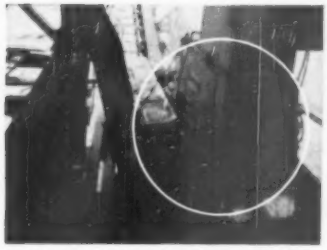
Get 8" or 1/8" minus

... with *Dual Impact Action*

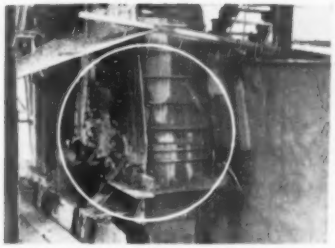
See how impellers in schematic drawing, rotating at speeds up to 1000 rpm, smash stone in *mid-air*. Three-way size-control assures production of sizes desired.

Only New Holland has it ...





In Ohio Bank Run Aggregate . . . "Capacity is twice that of two crushers replaced" . . . writes Robert Coe of Basic Construction Materials, about Model 2020 New Holland Breaker. Takes all rock passing 20" opening; yields clean, cubical aggregate minus 1" in one pass.



In Florida Coral Rock . . . G. D. Monroe, president, Miami Crushed Stone, reports, "a considerable saving on maintenance and power costs." Here, New Holland Breaker Model 3030 replaced 3 old-fashioned crushers, producing 80 tons per hour in closed circuit system.

In Georgia Limestone . . . "The ability of this breaker (New Holland Model 5050) to reduce 50" material to commercial size, passing minus 4", in one pass is remarkable," says W. E. Lambert, of Lambert Brothers. Takes up to 400 tons per hour on 300 horsepower.

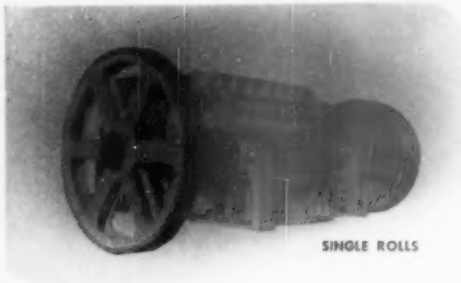
Write for free 16-page New Holland catalog. Get complete information on all 5 models of New Holland Double Impeller Breakers. See why "Dual Impact Action (exclusive with New Holland) does it again, and again;" how it produces more aggregate . . . cuts production costs . . . reduces maintenance. Address Department R-10.

Complete New Holland line includes Double Impeller Breakers, screens, hammer crushers and pulverizers, feeders, belt conveyors, storage bins.

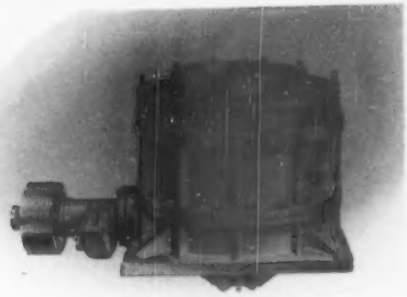
NEW HOLLAND DOUBLE IMPELLER BREAKERS

NEW HOLLAND MANUFACTURINC COMPANY, MOUNTVILLE, PA.

Affiliate of the Sperry Corp.



SINGLE ROLLS



KUE-KEN GYRACONES

Why you get better results when you

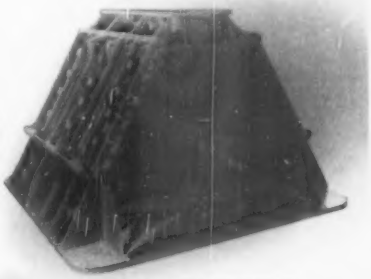
CALL IN PENNSYLVANIA

For years Pennsylvania has been working with and helping operators with all kinds of crushing problems. This accumulated experience plus a laboratory where the materials you want to crush are tested in a crushing set-up that duplicates your operating conditions, guarantees results before you go to the expense of purchasing and installing equipment. And there's another point that makes for best results for you. No one type of crusher meets all requirements. Pennsylvania has a varied line—a number of types of crushers to fit various conditions. Thus again you are more likely to get the crusher that gives the most desirable product at the lowest operating cost when you "Call In Pennsylvania." We'll be glad to send you bulletins on any of the crushers listed here.

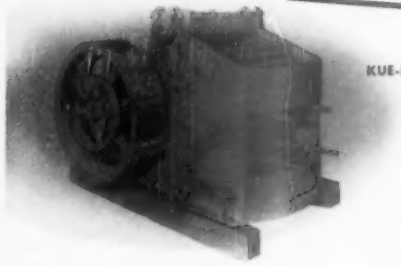
A varied complete line . . . Years of experience

PLUS

A laboratory that duplicates your operating conditions

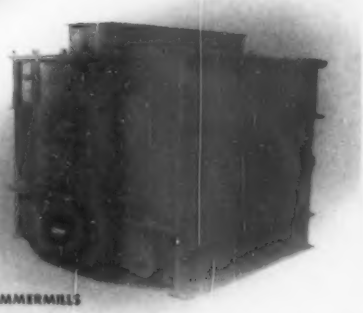


REVERSIBLE IMPACTORS



KUE-KEN JAW CRUSHERS

NON-REVERSIBLE HAMMERMILLS



REVERSIBLE HAMMERMILLS

PENNSYLVANIA CRUSHER COMPANY
DIVISION OF BATH IRON WORKS CORPORATION
1710 LIBERTY TRUST BLDG., PHILADELPHIA 7, PA.

New York • Boston • Pittsburgh • Birmingham • Roanoke
Detroit • Chicago • St. Louis • Crosby, Minn. • Los Angeles

Associated with
Fraser & Chalmers Engineering Works, London

Kue-Ken Crushers are obtained in western states from Straub Manufacturing Co., Inc., 507 Chestnut Street, Oakland 7, Calif.

PENNSYLVANIA CRUSHER COMPANY
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